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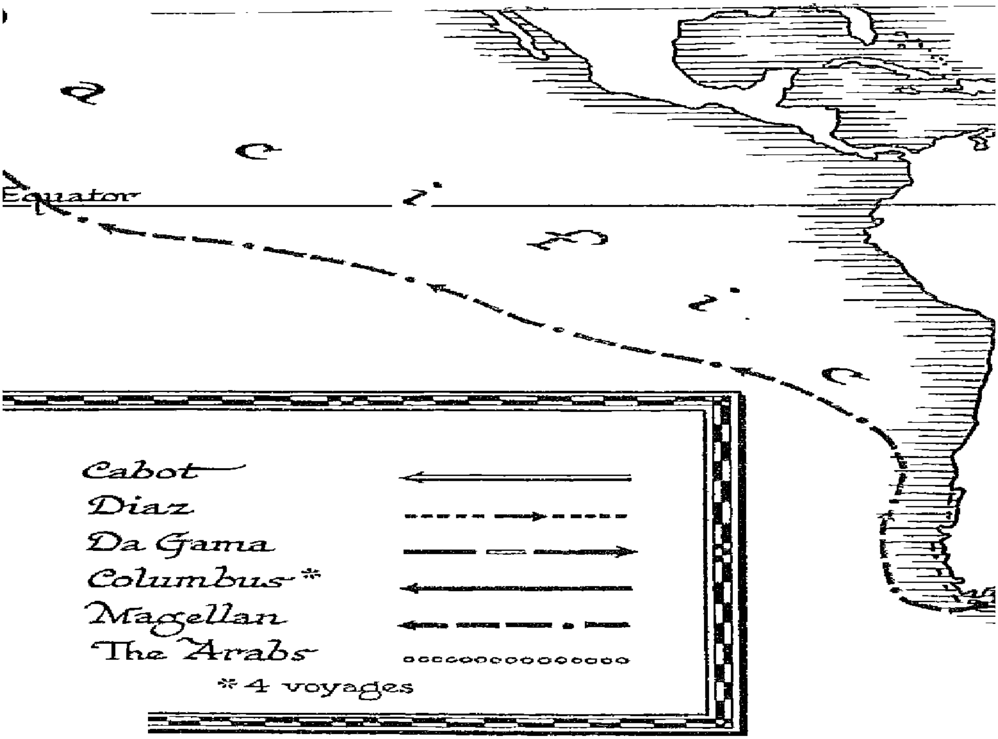

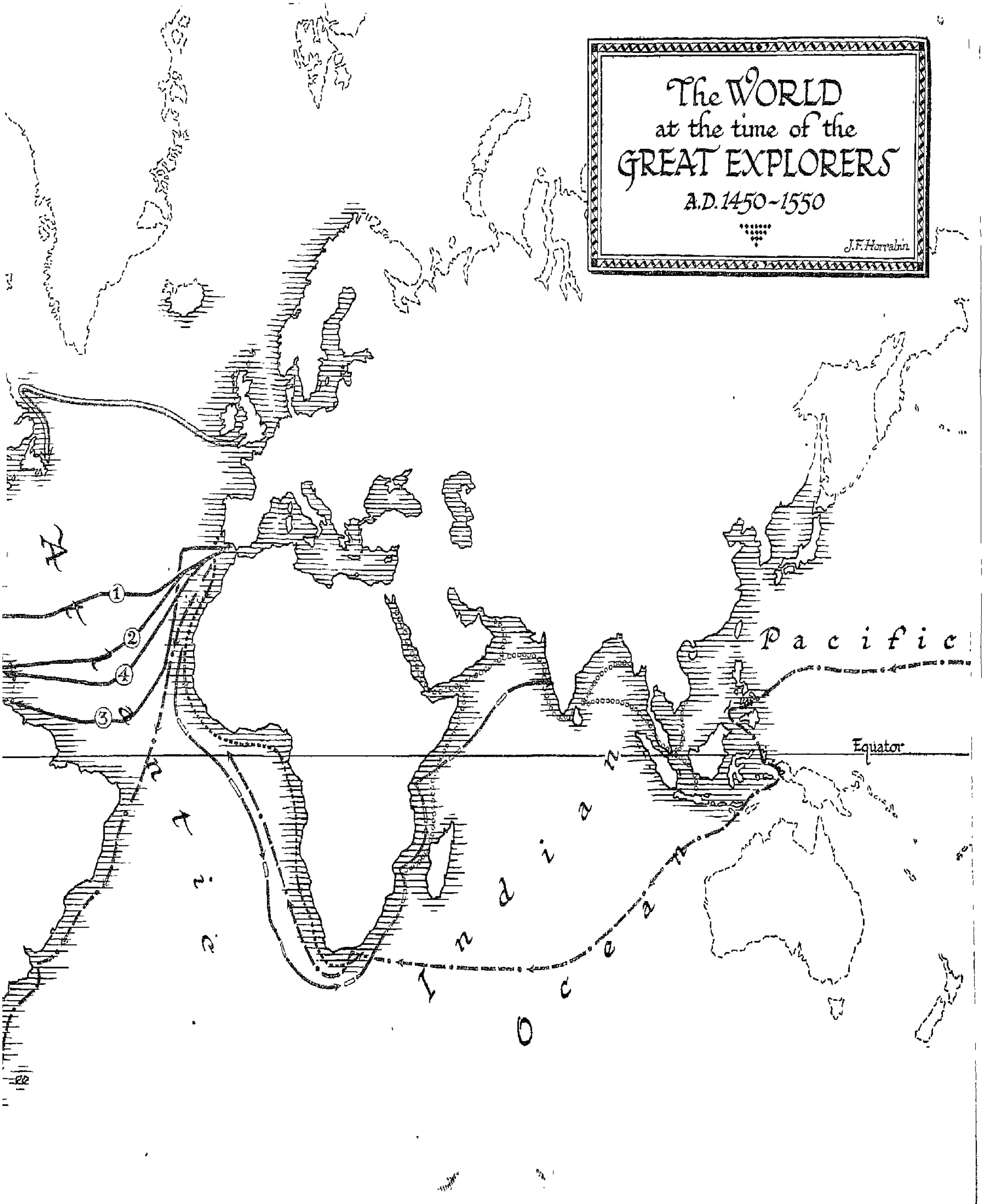

The WORLD
at the time of the
GREAT EXPLORERS
A.D. 1450~1550

SHIPS AND MEN

Shipping in London River A View in the King George V Dock

Photo Beckley By courtesy of the Port of London Authority

Ships and Men

AN ACCOUNT OF THE DEVELOPMENT OF SHIPS FROM THEIR
PREHISTORIC ORIGIN TO THE PRESENT TIME AND OF THE
ACHIEVEMENTS AND CONDITIONS OF THE MEN WHO
HAVE BUILT AND WORKED UPON THEM

BY

W. J. Bassett-Lowke

AND

George Holland

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PREFACE

THIS book is the fruit of a long love of ships of every kind and an interest in the welfare of the men who go down to the sea in them. We are not presumptuous enough to suppose that *Ships and Men* exhausts the subject-matter available, but we have tried to follow the main outlines of the evolution of ships from their primitive beginnings and to set this development against the general background of history. Ships are both a mirror and an expression of their times.

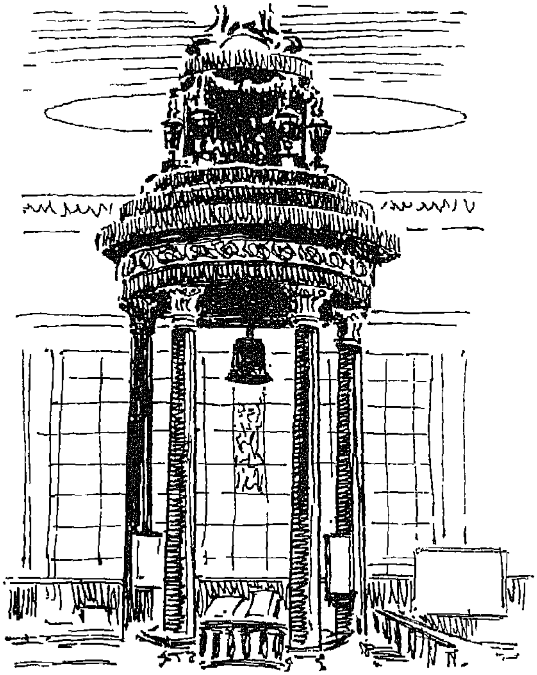
The facts in this book, as far as possible, have been carefully authenticated. The interpretation of these facts, especially in relation to the social conditions of men at sea, may challenge and provoke controversy, for it is in the interpretation of facts that differences of opinion arise.

Amid the mass of material consulted, and the many authorities to which we acknowledge our indebtedness, particular thanks must be returned to Mr Frank Bowen for his critical advice, Mr G. C. Rhodes, of the French Line, for his constructive suggestions, and to Mr Gilbert Thomas for his encouraging support during the progress of the work. We cannot sufficiently express our gratitude to all who have in many ways enabled us to enrich this book with helpful observations.

For many of the illustrations we are indebted to the Science Museum, South Kensington, and to British and foreign steamship companies, all of whom have shown a keen interest in obtaining a comprehensive selection of photographs.

If we have succeeded in writing a book which will appeal to those who are interested in relating the life of to-day with that of the past and in the social as well as the technical aspects of shipping we shall be amply rewarded.

W. J. BASSETT-LOWKE
GEORGE HOLLAND



The Lutine Bell at Lloyd's

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CHAPTER I

THE ANCIENT WORLD

(B.C. TO A.D. 1000)

Introduction—Prehistoric Man—Modern Analogies—First Efforts at Sailing—Origin of Coracle and Curragh—The Built Boat on a Frame—Where Ships were cradled—Early History of the Sail—The Lateen Sail—Babylonian Shipbuilding and the Ark—Contribution of China and Pacific Islanders to Sailing—Place of the Phœnicians among Early Navigators—The Cretans—Greeks and Romans—Shipping in the Mediterranean—Vikings and their Ships—The Nydam, Oseberg, and Gokstad Ships—Impulses of Progress.

> Ships are but boards, sailors but men.
>
> SHAKESPEARE, *The Merchant of Venice*

"I MUST go down to the seas again, to the lonely sea and the sky." So often we too have felt like John Masefield and packed our trunks and bags when holidays came round to be away to the coast. Do you remember how we used to try to pick out the boats: the stout little cobles off Scarborough, the quaint bawleys off Harwich, the red-sailed Rochester barges, with hulls battened down and nearly awash, beating up the river off Southend? It was a lovely sight on a summer's day, beside the Solent or at Torquay, to watch the yachts and the busy little motor-launches; and there was quite a thrill when a big liner sailed by the Needles, and inshore, so close that you felt you could touch her. The cross-Channel packets, the tramps and colliers with their "salt-caked smoke-stacks," the trawlers and drifters, the tankers, the dredgers and hoppers—ships of all sizes and all flags filled the sea with life.

There was no excitement to match the sight of the giant Cunarder *Queen Mary*, or the striking modern lines of the *Normandie* as they turned into the Spithead roads—rivals both for maritime supremacy, queens of the North Atlantic. It is hard to believe the *Normandie* will sail no more. Only one other sight was as memorable, if we were lucky enough to get it, and that was to see one of Ericsson's fine windjammers with sails all spread like a dream ship in the sunset. We forgot the smoky chimneys and the foundries, the cinemas and the shops, and all the thronging bustle of towns, and, in an absent gaze, succumbed to its spell. "Wonder," said Aristotle, one of the wisest of philosophers, "is the secret of happiness."

Yet where should we be without this traffic of ships? We are an island people, and draw our life from the sea. Without these ships the circulation of the cities would stop. Somehow, dimly, we know it. The salt sea runs in our veins. Have we not seen the miracle in this last war? Have we not watched the grey ships on a grey sea sailing in convoy, with planes watchful overhead, go over the horizon, and have we not thought of the people who man them? Many of these men had never been afloat on salt water in their lives before. They came from town and hamlet, from factory, office, and shop, and served skilfully and perilously in their ships. When they played with their model yachts and clockwork boats on the ponds in the parks, and on holidays watched the big ships sailing to far-off lands, they little knew that the day would come when they too would go down with grim resolve to the lonely sea and the sky.

Fantasy plays strange tricks. As the mists blow in a white cloud across the waters phantom ships sail—clippers with moonraker sails, galleons from the Spanish main, long-oared Viking ships that beached on our shores. From the aged Mediterranean lands came the Phœnicians to barter for tin. Ancient Egypt and civilizations buried in the dust renewed their life by the trade of their ships. Those men of so very long ago stand side by side with us, so shallow in reality is the deposit of time. Behind civilization stand the primitives.

There are still primitives, savages of brutish feature, as in Northern Australia, and we can see them poling their catamarans along the shallows—images of the first men. It was a Promethean discovery that a hollowed-out tree-trunk would not readily capsize; and this dug-out canoe, examples of which are still to be found in the Solomons, in the Gilbert and Ellice Islands, and in the Congo Basin, was probably the earliest type of boat. There is, in the London Museum, a marvellous, fossilized dug-out made from the trunk of an elm-tree and found in the Thames mud at Twickenham. It is certainly of prehistoric origin.

In the later Stone Age the arts of husbandry were practised, and weaving was applied to boat-construction. Now a new principle was involved, for a frame, or outer shell, had to be *built*. It was as revolutionary as the Babylonian arch in architecture. Whether the framework be covered by woven matting, bark, or skins, as in the *balsas* and coracles, or by steel plates, as in the modern vessel, the fundamental method remains the same. This primitive craft is comparable in age with flint knapping and wood culture. The coracle of the ancient Briton still survives in Wales, and in the Irish curragh, which is used by the men of Aran for off-shore work. The Eskimo *kayak*, consisting of a covering of skins over a framework of wood or whalebone, the North American Indian's birch-bark canoe, and the *balsa*, made by weaving reeds over a reed frame found among the treeless highlands of the Andes, are all as old as the Neolithic Stone Age.

The Origin of the Ship

Hendrik Van Loon, in his history of ships,[1] holds the view that they were cradled somewhere along the south-eastern coast of Asia or in the Pacific, rather than on the Nile, and makes strong claims for the Chinese sampan and junk as pioneers. Elliot Smith, in *The Ancient Egyptians*, says that the Egyptians "also invented shipbuilding and constructed the first seagoing ships," and there is much corroborative support for the theories of Elliot Smith and Perry, who trace all the earth's civilizations to Egypt; though devotees of a single idea may seek to prove too much.

The claim that the Egyptians invented shipbuilding is too large to be accepted without question. Certainly Egypt was the most important source of early culture, and at a very early date its people developed a remarkable perfection in technique. It is true that Egypt, the land of the Pharaohs was, geographically, ideally situated. The Nile not only provided a rich alluvial soil for food production but provided also a trade route and natural highway. It was the only country of the ancient world with ready access to both the Mediterranean and Arabian Seas, a sure stimulus for foreign trade which would require seagoing ships. Its natural geological products such as limestone, sandstone, and alabaster, as well as the harder rocks like basalt, granite, and porphyry and its supplies of brick, clay, and timber afforded both materials and opportunity for the development of skilled craftsmanship. It is true that Egypt has the longest recorded history of any civilization, due to the fortuitous legacy of their religion which led its people to build cities of the dead as well as of the living, and to bury within the temples, tombs, and pyramids—these fortresses against the tooth of time—the records on papyri and tablets, and the epitome of their artistic achievements in their funerary deposits. Thus Egyptian history can be traced back more than four thousand years before Christ.

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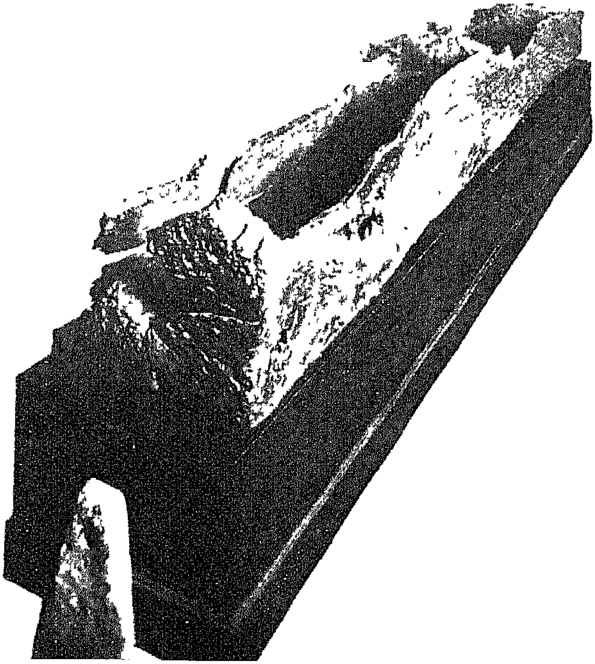
[1] *Ships* (Harrap, 1936).



A Dug-out Canoe discovered in the Thames Mud near Twickenham
By courtesy of the London Museum

But it is equally true that China enjoyed the same natural advantages of geographical situation and resources in materials. She possessed great navigable rivers and fertile soil and commanded the Pacific seas. She had the same stimulus to engage in foreign trade and the same need for seagoing ships. She developed an original and unique culture as widely different from the Egyptian as she was remotely separated by distance. Wilhelm's *Short History of Chinese Civilization*[1] and the researches of Ernest Fenollosa,[2] among other studies, establish that China was the mother of an art and a technique, highly individual and accomplished, which pervaded the whole Pacific lands from China to Mexico. Traces of her influence can be noted on the lintels of New Zealand huts and on Alaskan totem poles. It is true that the first reliable date in Chinese history is October 12, 2154 B.C., a millennium later than Egyptian record, but it is equally true that in the prehistoric Chinese period there was a politico-religious system indicating an ordered society, an ideographic script, and their crafts and range of materials proved these people to be superior workmen. The Chinese craftsman working in jade, the hardest of all workable materials, was not behind his Egyptian brother working in obsidian and turquoise. The characteristic *motif* of Chinese art is the rounded rectangle. It is the shape most commonly found in their ornament and expressed in Chinese script it is the symbol meaning 'kingdom.' It is the rough shape of the Chinese boat. Can it be suggested that such a people could not invent shipbuilding to meet their needs?

Egyptian Influence on Shipbuilding

But what of the eye which commonly decorates the prow of the junk, and which, by the way, is not unfamiliar in Eastern Mediterranean and Asiatic shipping, that has been claimed as another piece of presumptive evidence that Egypt is its birthplace, being assigned to Osiris? What of the wonderful New Zealand cave discovery, some twenty-five years ago, which emphasizes Egyptian influence? The answer is, surely, that at various periods different cultures influenced one another, diffusing themselves. It is not the contention that the Egyptians did not invent shipbuilding, but that they were not the sole inventors. The cultural influence both of Egypt and China spread with their trade and both directly and indirectly became an inspiration for both neighbouring and distant civilizations.

In the days of Queen Hatshepset, who was ruler of Egypt in 1500 B.C., there was a canal from the Nile to the Red Sea. Wall carvings on the temple at Deir-el-Bahari, near Thebes, represent two fleets of seagoing ships; and from the observed details we can see the construction of the hull of their ships, which were built of short, narrow pieces of wood, pinned together and strengthened with a rope tourniquet to avoid hugging—that is, the tendency for the ends to droop. This form of construction was determined by the shortage of timber. The shape of the hull indicates that it was developed from the original reed-bundle boats of the Nile, for there is a great overhang at each end. The Egyptians were intensely conservative in their building, and just as temple architecture in stone perpetuated the reed-and-clay structures of the first builders, so too their wooden-ship architecture copied the form set by the reed boats. These vessels had no keel, and depended for strength on stout sides and fastenings.

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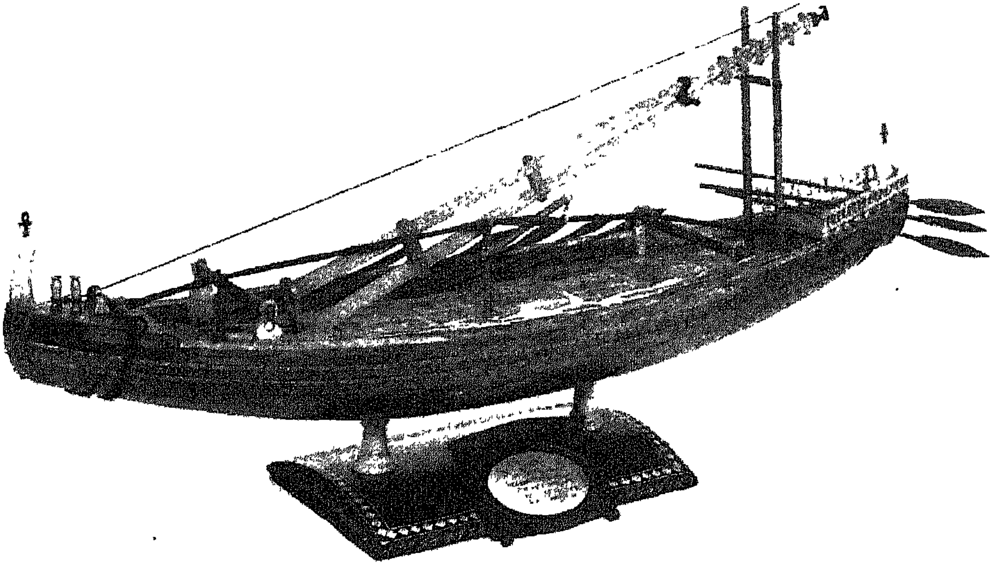
[1] Harrap, 1929.

[2] *Background to Chinese Art*, by Hugh Gordon Porteus (Faber and Faber, 1935).

In those countries where there was a plentiful supply of wood we get an entirely different construction of the hull. No one suggests that the dug-out canoe originated in Egypt, and yet it is the dug-out that provides the foundation of shipbuilding in Far Eastern waters. The hull of the Burmese ship has this origin and so also the craft in the Malay archipelago. The construction of the hull of the Chinese sampan and junk have nothing in common with Egyptian methods. There is another factor to be considered. Just as Egyptian arts and crafts were conservative in their forms, so the Chinese genius, dominated by Nature and ancestor worship, expressed itself along traditional lines. Their shipbuilding followed an unchangeable method, though, by experience, the means were improved. With primitive peoples like those in Indonesia, untrammelled by systems of thought like cultured societies, their crafts are free from self-consciousness. They create intuitively, for they have no knowledge and no other wisdom. They weave as a bird weaves its nest. They have a feeling for their material and for their tools, if they use them, and a definite sense of purpose. Hence their boats which ride the swift currents running between the islands have an instinctive form which is both beautiful and effective. They have the originality of a fresh creation.



A MODEL OF AN EGYPTIAN SEAGOING BOAT (CIRCA 2600 B.C.)
By courtesy of the Science Museum, South Kensington

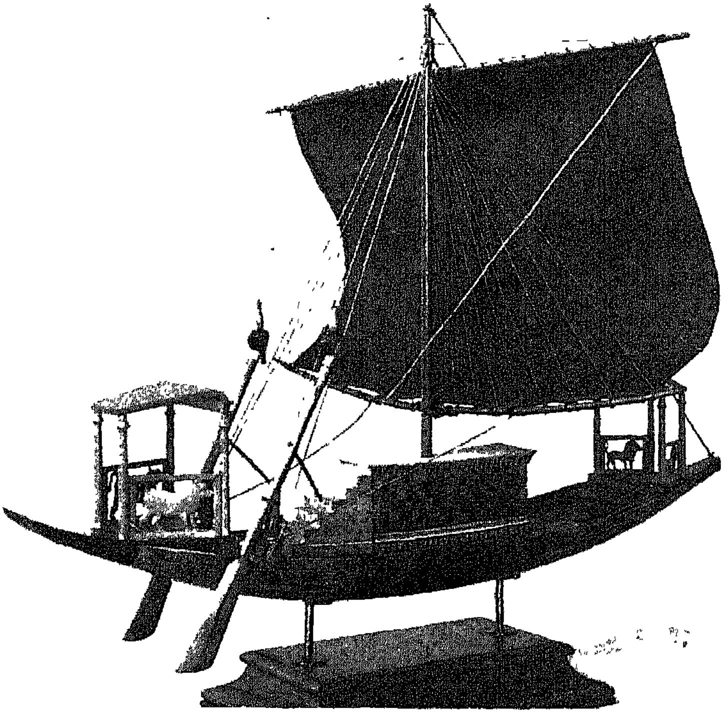
The need for ships is an early one, and the problem of building them would be conditioned by the *genius loci*. The Egyptians, as leaders in the march of civilization, exercised a marked influence, but this is not to say they were the dictators of naval architecture, or that they were the only inventors of ocean-going ships. That their influence was felt is not questioned, for man in the main is very limited in his view and unenterprising in his practice, and it would be surprising if the civilized arts and crafts did not spread. There is still another point. Necessity is the mother of invention. If the impulse is strong enough the means to satisfy it will be found. All peoples with a navigable river and a seacoast have the urge to sail on the waters. The prizes of trade and the demands of warfare would create shipbuilding as an independent effort. The claims of Egypt as the founder of all civilized activities can be pressed too far. Of solid evidence that India received her culture from Egypt there is none at all. As regards the spread of this culture beyond Oceania, Australia hardly comes into the picture. And what does the Maya civilization in South America owe to Egypt? For parallels of independent invention at the same time in different places to satisfy an urgent demand we need only look at the history of printing in the Middle Ages, generally ascribed to Gutenberg of Mainz, but challenged by other pioneers in the use of movable types, especially Coster and the early Dutch printers, or in modern times to the history of the cinematograph. William Friese Greene in England, Edison in the United States, and the brothers Lumière in Paris all solved the problem of the moving picture independently of each other. Can we dismiss the idea of the spontaneous growth of culture or that the invention of shipbuilding was not the sole achievement of one people?

Invention of the Sail

From the hull the next inventive leap was the sail. Theorists may guess where and when this problem was solved. Excavations by Sir Flinders Petrie in 1929 revealed in the Fayum districts of Egypt a stone model, probably 11,000 years old, of a reed boat with a kind of deck at the stern which may have carried a sail. Incidentally, boats of this type are still used in Bolivia, on Lake Titicaca, and those who man them hoist a sail made of matting raised between two separate masts, lashed together at the top, and fastened at the bottom to the sides of the boat. It was a feature common to the very early Egyptian ships of about 6000 B.C.; by 4700 B.C. they used a self-supporting tripod mast.

By 4000 B.C., or earlier, sailing-vessels were used regularly on the Nile. The tombs of Egypt abound in pictures of boats and larger vessels, and it is clear that the use of sails dates from a period as remote as the Pyramids. A stone carving of a ship about 3000 B.C. shows a mast with two spars, and ropes from the ends of the yards to the stern, by which it can be turned to catch a wind not directly following. An ancient Egyptian fairy-tale describes a ship with sail 150 cubits long and 40 cubits wide (225 feet by 60 feet)—quite a big ship for the time—manned by 150 sailors. These measurements are only conjectural. There is no conclusive evidence of the precise length of the cubit. It is variously fixed at 18 and 22 inches.

All this is not enough to ascribe with certainty that the sail first appeared in Egypt. It must be remembered that the perfection of Chinese art before 2000 B.C., the skilled weaving in silks, the fine pottery, the remarkable casting in bronze, the rare workings in jade, the use of weights and measures, and the knowledge of the pictogram script all witness to a long civilized era, covering probably two millenniums in its development, of which we have no precise dates. But it would be very surprising if in these equally remote periods of which, unlike that of Egypt, our knowledge is dim the sail had not been introduced. And when we consider the conservatism of the Chinese junk and sampan repeating traditional structures it is more than probable their sails were first hoisted in the legendary past.

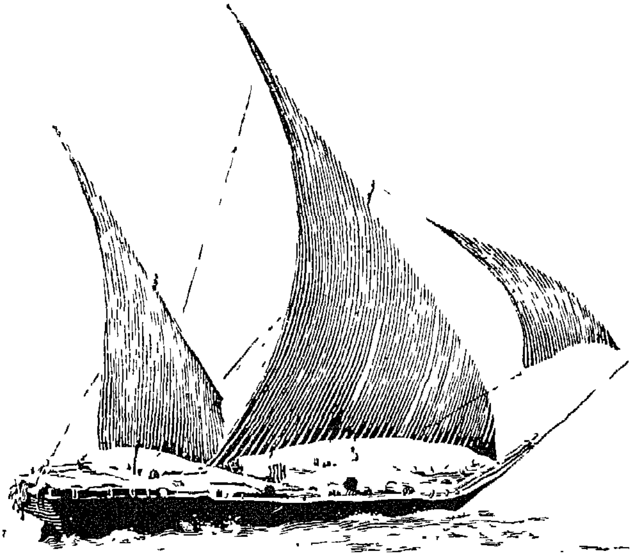


AN EGYPTIAN SHIP

From a model in the Science Museum, South Kensington. Crown copyright

Even in relation to ancient Egypt, of which civilization we have the clearest knowledge, a cautionary word on dates fixed in these remote periods is called for, because it is impossible to be exact. So much so, indeed, that the dates of the Old Kingdom of Egypt cannot be fixed within five hundred years. But dates serve as milestones on the journey through time, and though the early ones are almost undecipherable in their crumbled surfaces, they still encourage us to guess. In temple illustrations and inscriptions abundant evidence undoubtedly exists of the interest of the ancient Egyptians in shipping, both for war and commerce, though they were not a seafaring folk, but an agricultural people. Further, the scarcity of timber severely handicapped construction. The only indigenous woods of any use were sycamore and acacia, and the latter did not provide the length of plank required for the building of long seagoing craft, of the type built to cut through the water at speed.

Our knowledge of ancient China has been severely limited by the calamity of the burning of the books by the notorious Shih Huang in the third century B.C. This, however, we do know, that while the Egyptian genius which had maintained supremacy for thousands of years yielded to the Greeks when they assumed the leadership of civilization the Chinese reached their zenith at the time of Pericles in Athens. They enjoyed a longer period of undisturbed history than Egypt. Not war but commerce activated the building of ships, for they have been traders from time immemorial. They had problems in sail craft unknown to Egypt. And was it not the Chinese who first used the magnetic compass?



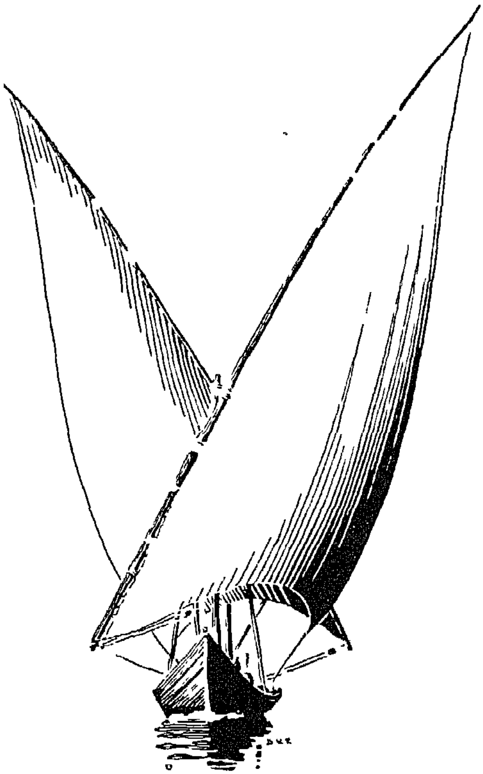
THE BOMBAY BATTELA
By courtesy of the P. and O. Steamship Company

The Evolution of the Sail

The evolution of sails, like all other developments in the craft of shipbuilding, is prompted by the laws of necessity. The ancient Egyptians hoisted a crude square sail, and not till the death of Alexander the Great in 323 B.C. was the art of sailing with the wind nearly abeam practised. Egyptian sailors relied on a following wind and stowed away mast and sail when it did not blow. In the Far East and among the Pacific Islands a problem much more difficult had to be solved. How were they to cross from island to island in the face of an ever-steady trade-wind?

This problem was solved by the 'lateen' sail, triangular in shape, supported by one spar along the upper edge; this spar was supported in the middle by the mast. By this device they could sail at right angles to the wind—a distinct advance in sail craft. The lateen, a sort of leg-of-mutton sail, was to play a big part in sail history, and it was introduced into the Mediterranean by the Arabs in the seventh century.

This Muslim invasion, stopped by Charles Martel at Tours in A.D. 732 in one of the decisive victories of the world, was the third great attempt of the East to overwhelm the West; the defeat of Persia by the Greeks at Marathon in 490 B.C. and at Salamis in 480 B.C. and the overthrowing of Carthage by the Romans in A.D. 146 were the other two.



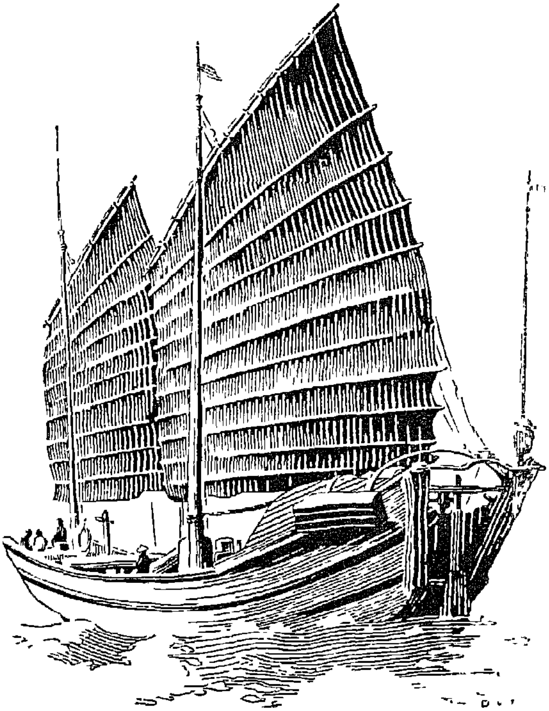
THE EGYPTIAN FELUCCA

By courtesy of the P and O. Steamship Compan

Noah's Ark and Babylonian Shipbuilding

Tradition regards the Ark as the first ship, but the precise shipbuilder's instructions in the sixth chapter of Genesis definitely indicate a skilled knowledge far beyond first architects. The excavations at Ur, the city of Abraham, show that about 2000 B.C. her ships were sailing from this thriving port all over the then known world. The Bible is not only a book of Holy Writ but a library of history that throws illumination on these remote periods. Schliemann in 1870 demonstrated the historical basis of Greek legend, and the same exercise applied to the Hebrew story has had equally profitable results. The Euphrates valley, as the records of its architecture and art disclose, was subject to calamitous floods, and the story of Noah thus has its foundations in fact. The measurements of the Ark can only be conjectural, though a commonly agreed measure fixes the length at 450 feet, the width at 75 feet, and the height at 45 feet. Berosus, a Babylonian of the third century B.C., gives it epic proportions, roughly equivalent to twice the size of the great Pyramid of Cheops, but these can be discounted as a picturesque exaggeration. Like children anxious to impress, most very early descriptive writers were guilty of "terminological inexactitudes" of this kind.

Commonly with many ancient boats the Ark probably had three decks, and in the conservative traditions of Euphrates construction was probably a reed structure coated with pitch. Having neither oars, rudder, nor sail, drifting on the face of the waters under divine guidance, it has no evolutionary place in the history of the ship; but besides pointing a moral to adorn its tale, it witnessed to the boat-builders' craft in Mesopotamia in the fourth millennium B.C. The story of Noah and the Ark has captured the imagination of all ages. Universally popular as a toy in the nursery it has also added its inspiration to literature. It is particularly pleasant to recall the quaint book of prayers, *Foure Birds of Noah's Arke*, by Thomas Dekker, the Elizabethan playwright, the delightful fantasy by the contemporary French dramatist, Obey, entitled *Noe* ("Noah"), and Marc Connelly's modern Negro mystery play, *Green Pastures*.

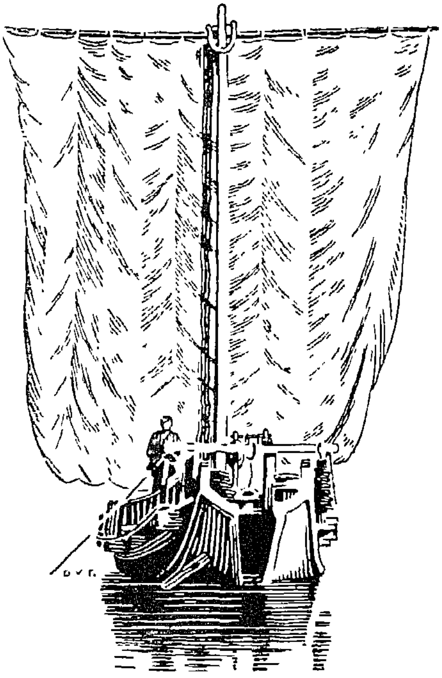


THE CHINESE JUNK

By courtesy of the P. and O. Steamship Company

We should not expect to find any important innovations from the boat-builders in the Euphrates-Tigris valley. If we look at the pictured records of the interests and occupations of the Babylonians, as they are vividly portrayed on the tile ornamentations of their palaces, we find few descriptions of shipping. These very realistic representations show their interest in agriculture, in irrigation, and depict social conditions. They were fond of luxuries, and Babylon was the market of the East.

But their traditions, like those of all Eastern peoples, were very conservative. Neither the material nor the incentive was present to encourage venturous shipwrighting. The coastal trade carried on within narrow seas was mainly in Egyptian hands. Egyptian boats sailed down a little canal cut in the track of the present Suez Canal into the Red Sea and the Persian Gulf, and the boats the Babylonians sailed from Teredon and Ur were identical with those from Egypt. The Assyrians constructed tub-like, basket boats, which they drifted downstream with their loads of granite for the building of their vast palaces, and these were probably hauled back again on the backs of asses. Even to-day, on the upper reaches of the Tigris, there may be seen cylindrical wicker craft called *gufa*, or *guffa*, carrying fruit and vegetables as they did over three thousand years ago.



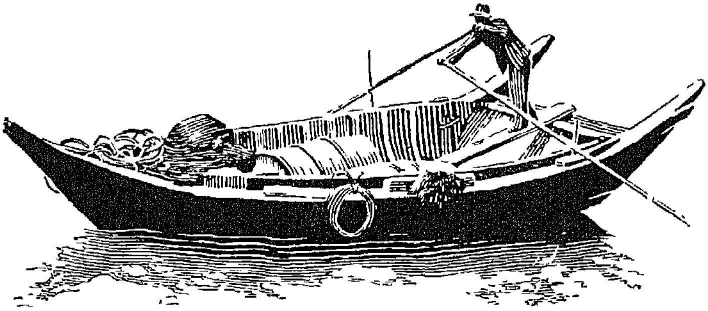
The Japanese Fishing-boat
By courtesy of the P. and O. Steamship Company

The Contribution of China and the Pacific

Eastward beyond the Indies we enter a world apart from that which established its civilizations in the Near East. Though we know the Phœnicians reached the north-west coast of India, far Cathay and the isles beyond were out of their ken. These regions fell within the orbit of China. Walled in for thousands of years and looking out on the China Seas and the Pacific she gave its peculiar genius every possible encouragement. To the Chinese the phenomena of Nature were classified under two heads—wind and water. Is it surprising, then, that China was enormously interested in boats and ships? They sailed up her great rivers, and they sailed out to the islands of the Indies and to the coral atolls in the Pacific. Chinese literature is often inspired by the rivers and the sea, and in this little poem, written some 500 years B.C., we have an exquisite cameo, poignant in its simplicity, of a farewell:

> Kojin goes West to Ko Ka Kuro,
> The smoke flowers are blurred over the river,
> His lone sail blots the far sky,
> And now I see only the river,
> The long Kiang, reaching Heaven.

The Chinese were poets, philosophers, artist-craftsmen. But the Chinese mind holds two complementary views of life, for the Chinese are also supremely practical; indeed, Bertrand Russell has called them the most practical race in the world. A Chinese junk may not look much of a craft, but it has every quality of seaworthiness. There it goes, a crazy, top-heavy, Heath Robinson sort of ship, with matting instead of regular sails, loaded with merchandise and yet able to weather the typhoon and the tornado. So it sails to-day as it has done for thousands of years. No ship designed in the Mediterranean could match it for safety and comparative comfort. Clean, well ventilated, spacious and serviceable, cheap to build and to maintain, Chinese junks are perfect expressions of the practical genius of their creators. So too is the Chinese sampan—that raft-like contraption of heavy logs turned up fore and aft like a boat, spreading its matted sail to the wind, and ideally suited for river-traffic. Out of the three hundred odd types of junk we have no early examples preserved, as in the Oseberg and Gokstad discoveries of primitive Norse ships, but we know, by countless instances, through Chinese art and literature, that similar vessels to some now sailing have sailed the waters of the East for thousands of years past.



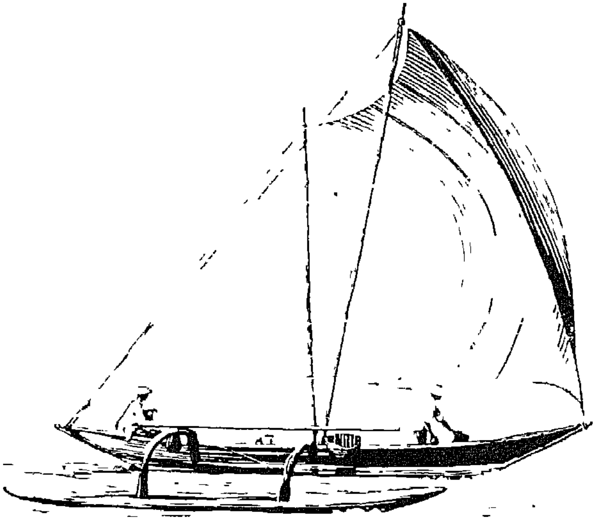
THE MALAY SAMPAN
By courtesy of the P. and O. Steamship Company

And among the Pacific islands, along the creeks of south-eastern Asia there were pirates ever prowling in their canoes—the dreaded and almost legendary Malay pirates to plunder them. These craft, that could ride the waves of an ocean that in its ways was by no means pacific, and battle with its currents, were often fitted with outriggers—a device of parallel slats attached some five or six feet away from the sides of the boat—as stabilizers. The catamaran is a good illustration, and served the same purpose as our sea-plane floats of to-day. Double canoes were also used both for piracy and trade, and so skilfully were they navigated that they could ride the whirlpool. Alas, little is left of such primitive craft in these Polynesian waters, for the peaceful pursuits of the unspoiled natives—fishing, weaving, and all the spontaneous wonder of their primitive arts—have been capitalized, commercialized, and annexed by the cruising and tourist companies and later by Hollywood. Still in the Celebes Sea are islands with houses built like boats, keel upward; and in the Sulu Islands houses with gables like the poop of a junk. These are the seas of the lateen sail, where the Chinese junk has hogged from the dawn of time.

The Phœnicians among the Early Navigators

The seagoing ships of the ancient Western world owe most to the Phœnicians of Tyre. Hear Ezekiel's tribute (Ezekiel xxvii) to the sailors and the city of Tyre:

> O thou that art situate at the entry of the sea, which art a merchant of the people for many isles. . . . They have made all thy ship boards of fir trees of Senir: they have taken cedars from Lebanon to make masts. . . . Of the oaks of Bashan have they made thine oars; . . . have made thy benches of ivory, brought out of the isles of Chittim. Fine linen with broidered work from Egypt was that which thou spreadest forth to be thy sail.



THE CEYLON CATAMARAN
By courtesy of the P. and O. Steamship Company

Shipwrights, mariners, traders—we know little of the hardy adventurers who hired their services, who fared forth to far lands even to the Tin Islands (Britain) and the coasts of India and Africa, and who brought home in their ships' holds gold, silver, and precious stones, spices and incense, "ivory, apes, and peacocks," rare woods for the cabinet-maker, fine pottery, chased and embossed drinking-vessels, and exported, dyed fabrics of Tyrian purple.

The presence of copper and tin in their cargoes speaks of a new age of metal, for these are the constituents of bronze. All early civilizations aimed at self-sufficiency—how modern the idea—and imported only luxuries. The difficulties of communications would determine settlement in regions which could produce necessities; the difficulties in transport would militate against bulky cargoes. But the introduction of metal opened a fresh era. Metal, bronze in the first instance, is so superior for armaments as well as general utensils that it became a necessity, and as tin and copper were scarce, the earth had to be scoured for both, and the search prompted intrepid explorations into the unknown. The Phœnicians were pioneers of the trade routes. The Bronze Age may be said to begin about the time of ancient Crete (*circa* 1500 B.C.), for in the excavations at Knossos not only gold ornaments but dagger-blades and fish-hooks of bronze were found.

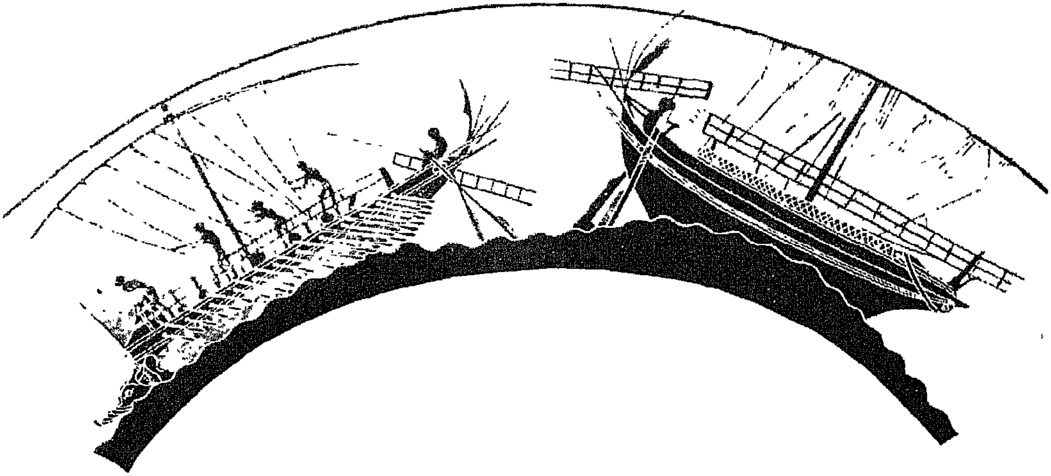
First they had to build ships seaworthy enough for their ventures. The round, wicker pirogues of the Babylonians, the raft-like structures of the Chaldeans, and even the short river craft of the Egyptians offered no pattern. But the Phœnicians came from a land of tall trees, and by 750 B.C. they had fashioned a long type of boat propelled by many rowers and fitted with a beak-like ram. For not only had they to contend with storms and nature's perils, but with pirates. They mastered the craft of cordage, for they were skilled weavers, and ropes were essential. They mastered too the art of stowage, for shifting cargoes spell shipwreck. Men of the East have always studied the heavens, and they knew how to steer by the fixed pole-star. But how did they provision themselves on such long journeys? It is a baffling speculation. True, a handful of dates was enough to support these early sailors for twenty-four hours, but that does not solve the problem.

They established colonies in every part of the Mediterranean—Carthage, Cadiz, Marseilles, Sardinia, and Corsica. Always they used the square sail for the following wind, and that they did not invent more labour-saving tackle is explained by their command of slave labour. All ancient civilizations were built on slavery, and their lack of initiative in invention was because the imperative need to save labour was not felt. They probably used 'dead eyes' for setting up rigging, which the Romans later adopted from the Greeks. They used the anchor, at first a weight of stones, and they gained the unenviable reputation of all shady 'middlemen' in business by their shrewdness and profiteering. They invented horrible stories of dangers in order to keep competitors out of the trades they were opening. Essentially materialistic in their philosophy, they left to posterity not an art but an alphabet, not a literature but a ship's manifest. So Tyre and Carthage in their turn fell; "I will make thee a terror, and thou shalt be no more: though thou be sought for, yet shalt thou never be found again."

The Ships of the Mediterranean

The ships of Crete, Greece, and Rome followed the same tradition, and it may seem paradoxical that the highly intelligent Hellenes, and their forerunners, the Cretans, with their vastly different outlook on life—imaginative, perceptive, concentrating on the art of living, dwelling within sight and sound of the sea, and both creative, especially the Greeks—it must seem almost inexplicable that they did not contribute substantially to the ship's development. For the Greeks were men of commerce, and the Athenian patrons of art and learning were merchant princes. Again, the answer is slavery; for though the domestic slaves were as members of the family, the predial slaves, such as captives and convicts, had neither rights nor mercy. The progress of human emancipation throughout the ages has been in the discovery of good motives in human relations. Those we now assume have the status almost of instincts but they did not operate until comparatively recent times, for the social conscience dates from the declaration of the "Rights of Man" in the famous assertion of the American Declaration of Independence.

The ships sailed on the tideless Mediterranean, and the oar was an efficient propeller. Long, lean and swift, finely proportioned, powerfully propelled, very manœuvrable, they served. Biremes and triremes, two and three banks of oars respectively, remained the standard type. Square sails were an adjunct, not a necessity. But the idea that Greek and Roman galleys were propelled by rowers arranged in successive banks, or tiers, one above the other has now been discredited. It is one of the most difficult and puzzling problems to solve the exact arrangement of oars and rowers, and many diverse theories have been put forward. Recent discoveries have done something to elucidate the problem, but there is still a difference of opinion. The drawings on Greek vases, the fragment on the Parthenon, and the depiction of a bireme on the pedestal of the statue of Victory from Samothrace in the Louvre, together with the scattered observations by Classic writers, are the only meagre details available, and they are capable of varying interpretations. Greek artists, seeking to render a picture of both sides of a ship, could only do so by arranging the rowers at two levels. The impression is gained that the rowers were arranged on platforms one above the other; the top platform appears as an outrigger, or flying deck, known as the *apostis*, and longer oars are used from this level. This arrangement works for a bireme but becomes a *reductio ad absurdum* as the platforms, or banks, are multiplied. It will not fit the series of quadriremes, quinquiremes, and sixteen-banked galleys.



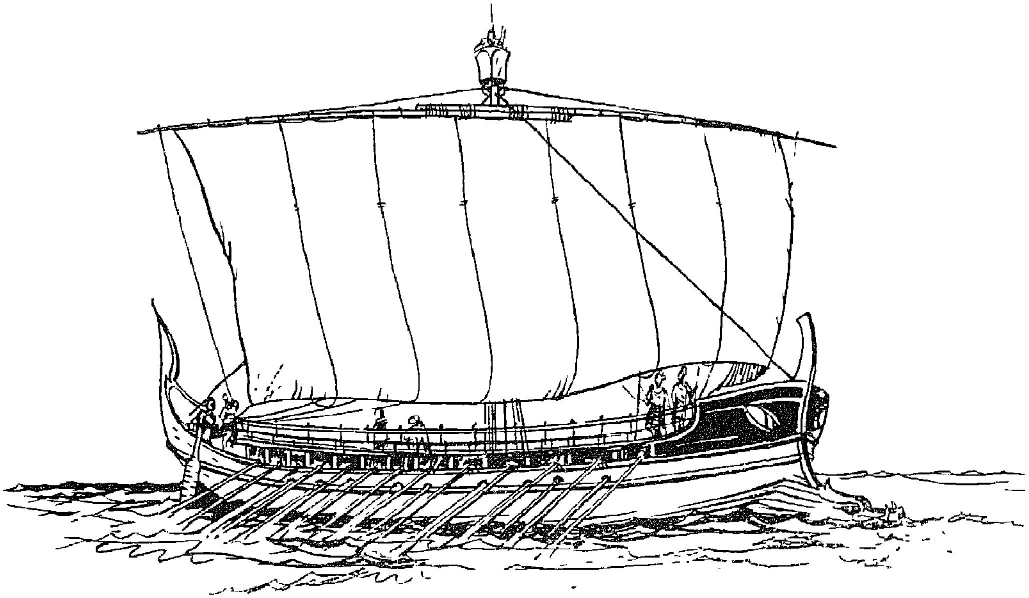
A GREEK SHIP AND GALLEY, 500 B.C.
By courtesy of the Science Museum, South Kensington

The first Greek galleys of about 1300 B.C., as pictured on a vase of the period, were long, open boats with a high stern and a bow for ramming the adversary. They carried fifty oarsmen. The 'bireme,' introduced from Phœnicia about 700 B.C., and the 'trireme,' which was used in Egypt in 600 B.C., and was in general use in the eastern Mediterranean a century later, introduce a new problem. How was it solved? Possibly outriggers for these two types were used, and there is support for the theory in the fact that oar-ports are provided. The contrary opinion holds that these oar-ports, shown on the bireme represented on the statue in the Louvre, are only cat-heads for the anchors. The probability seems to be that biremes and triremes were built with flying decks, but in all the multiple-reme classes the galleys were identified by the number of men on each oar.

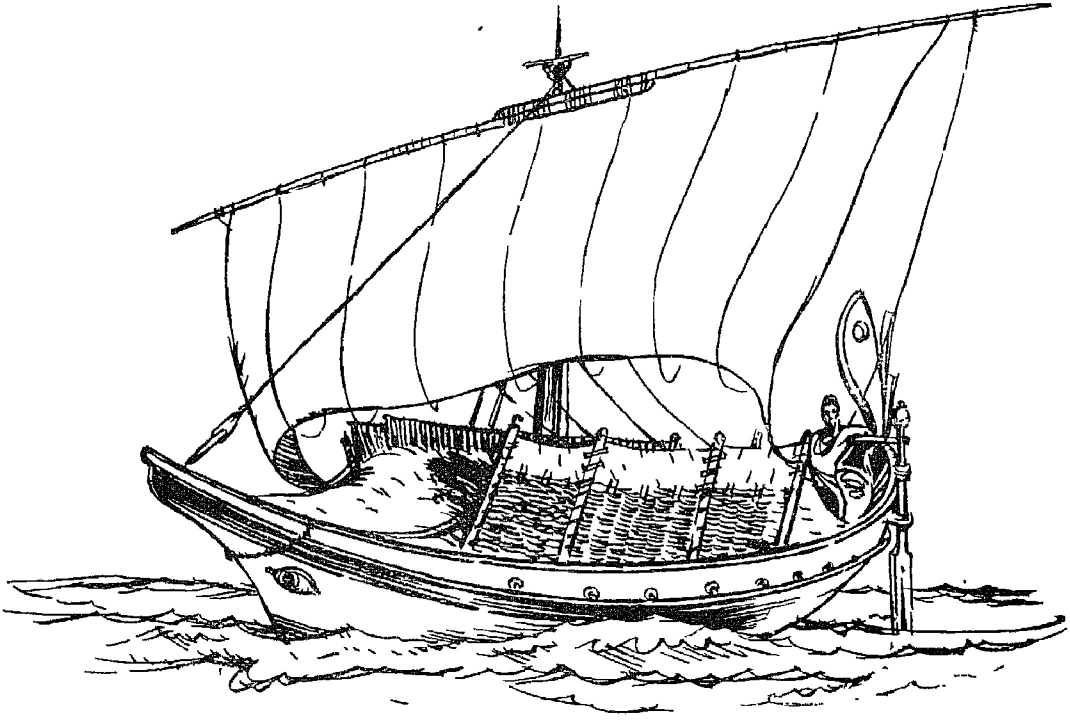
While the fighting galleys were long, and moved by oars, the merchantmen were round and depended on sails. The round ship reaches far back. Galleys too had sails, but they were only for occasional use. Merchantmen were higher and deeper in relation to their length than the galley; fat and tubby ships designed for cargo space. Of these the illustrations by Greek artists are few in comparison with those of the galleys—and these are few enough—doubtless because their proportions were less pleasing, but one of a merchantmen of the fifth century B.C. shows that it carries a single, big, square sail and no oars. The practical Romans developed the round Greek merchantman, fitting the big, square mainsail amidships, and a *rafee*, or a triangular topsail, that could be set above the mainsail in light weather. Another feature was a smaller, square sail on a small, sloping mast over the bows, known as the *artemon*. This, in effect, is what we know as the bowsprit, and it helped the ship to windward and so assisted the steering. Its invention by the Romans, whose genius in engineering and road-making did so much towards the improvement of communications throughout their empire, seems to have been lost after the fall of Rome, and it was not rediscovered till the Middle Ages.

Carvings found on a tomb at Pompeii about A.D. 50 and at Ostia, the port of Rome at the mouth of the Tiber, dated about A.D. 200, give us valuable details of the Roman merchant ship. They not only show the scheme of the stay and shrouds, but a complicated system of 'brails,' or cords passing through rings, for gathering up the sail. The stern of a Roman merchant ship was high out of the water; this was to prevent pooping—that is, being overwhelmed by a following wave in a heavy sea. An interesting detail in the account of St Paul's journey in one of these ships is that the anchors were cast over the stern. It can readily be understood that the rudders could not be left down while the ship was anchored, and so rudder-bands were used to haul the rudders out of the water when the anchors were cast. The later Roman merchant ships of about A.D. 200 were two-masted vessels.

Exactly how these ancient Mediterranean ships were constructed it is impossible to say. By a synthesis of the accumulated details derived from fragmentary sculpture and literary reference, and by facts obtained from excavation—much valuable data was obtained from the piece of a Roman vessel unearthed in digging the foundations of the L.C.C. County Hall, on the south side of the Thames, now preserved in the London Museum—it has been possible to make certain deductions. They appear to have been built with keel and ribs, quite unlike Egyptian vessels, and there was at least a rudimentary stem and stern-post. The planking was carvel.

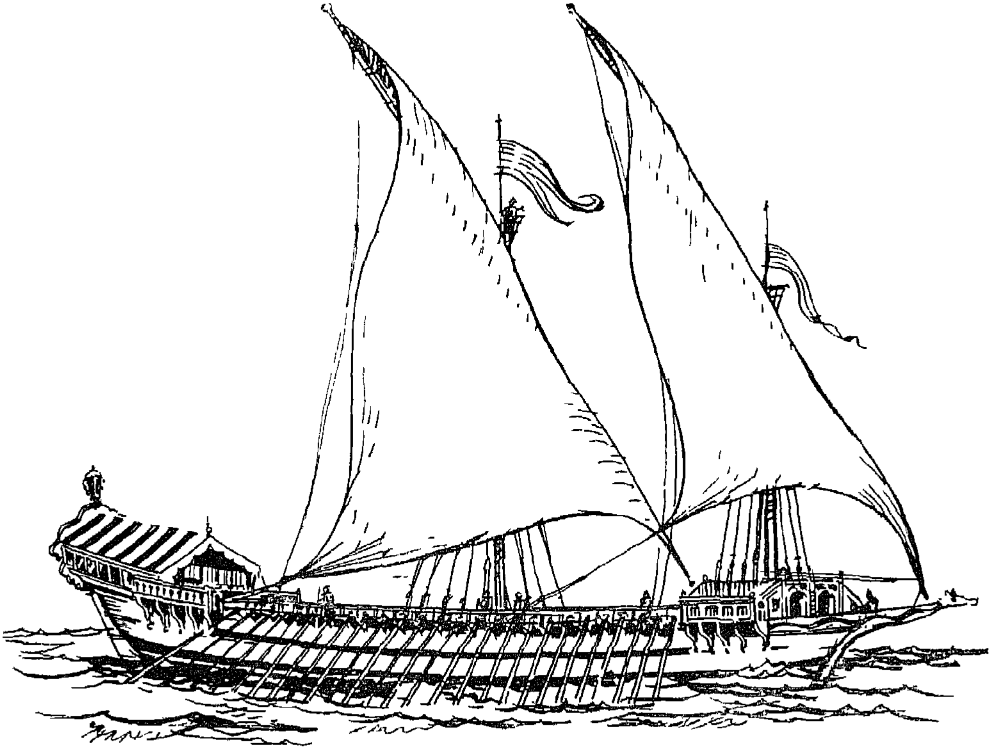


A Greek Galley, 500 B.C.



A Greek Merchant-ship, 450 B.C.

In carvel construction the planks are all flush, giving a smooth boat-face. In clinker construction each plank is overlapped by the lower edge of the plank above, giving a tiled-roof effect. That this makes for strength and seaworthiness is shown by the fact that to-day many ships' lifeboats and inshore fishing-boats follow the clinker, or clincher, principle. Modern R.N.L.I. lifeboats and fishing-smacks were and are carvel-built, not clinker. Dutch luggers are clinker with extra-wide planks. Clinker methods are cheaper and easier to repair of local damage.



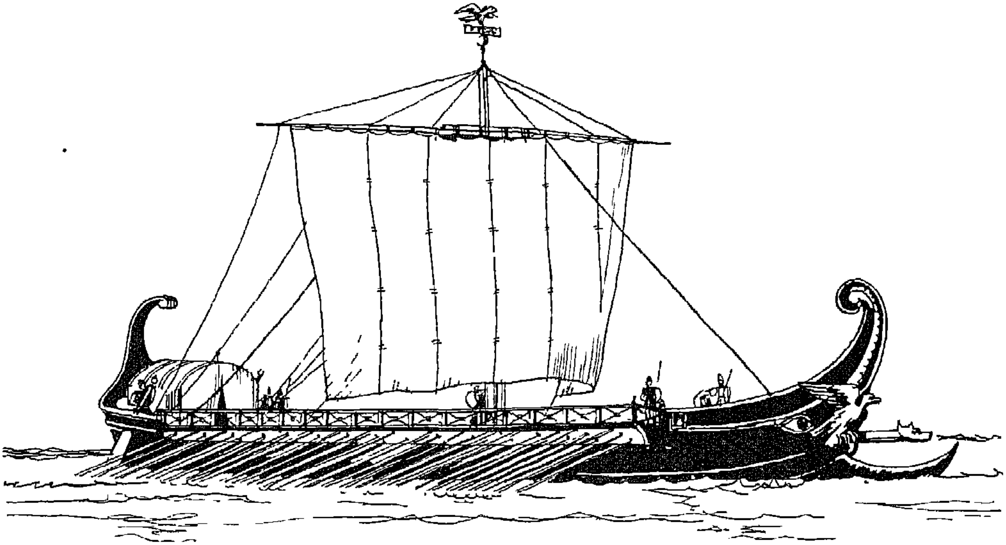
A ROMAN GALLEY, CIRCA A.D. 200

In these ancient Mediterranean ships wood tongues and bronze nails were used to fasten the planks. The workmanship, as might be expected of a people who possessed such genius for architectural and engineering construction, was that of accomplished craftsmen.

The Romans copied the Greeks in their shipbuilding, as they did in their culture, but, bringing their essentially practical genius to bear on their navigational construction, they improved and developed the craft. As they spread their empire over the known world, all roads by land and sea led to Rome. Overwhelming all rivals—Greece, Egypt, Carthage—Rome assumed command of the seas, though it took more than two centuries to clear the Mediterranean of pirates. The Romans also kept strict watch on the Arab pirates and cleared the canal from the Nile to the Red Sea, which had silted up. For the first time trade could flow in comparative safety from attacks of brigands and pirates over wide areas of land and sea.

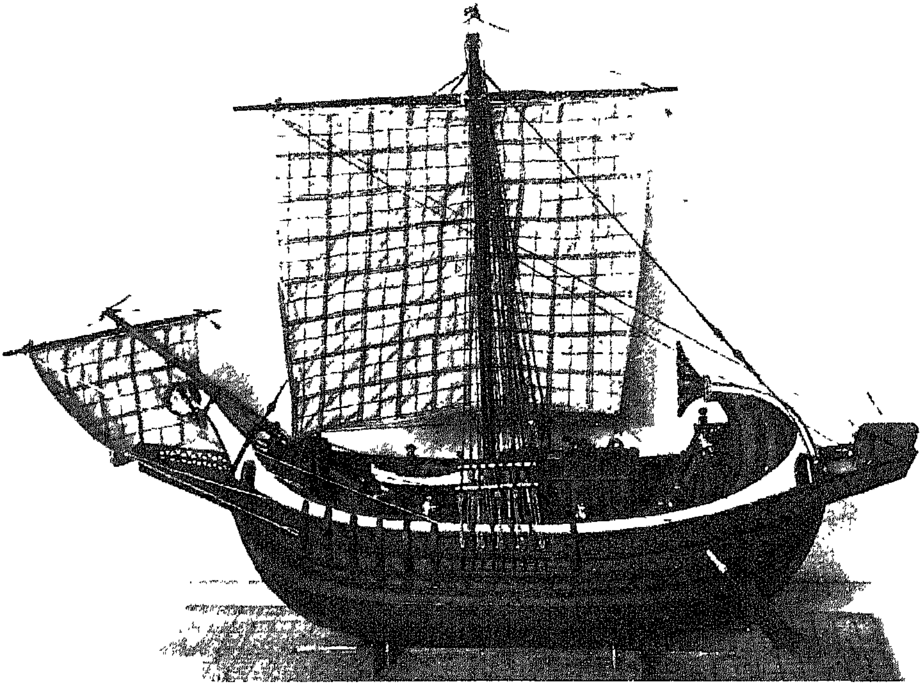
The Cæsars held undisputed sway from the Atlantic to the borders of India, and by their control and discipline made international trade on a substantial scale possible. Not only did trade flow safely over the highways and seaways within the Empire, but there were commercial links with India and China. Most of the Chinese imports of silk and silk goods reached Rome by the overland routes, but there was a considerable volume of shipping engaged on the Indian routes.

The Greeks had developed commerce, especially within the Mediterranean and the Black Sea. Athens had imported the bulk of her grain supplies, and other Greek cities in times of poor harvests relied on the Greek corn-ships to bring in food. But the Greeks not only traded over narrower limits than the Romans; their trade-routes were not so efficiently policed, and their traders earned an unenviable reputation for sharp practices. The Romans protected both producer and labourer, supervised marketing, and established stable conditions so that commerce was regulated. Traders had the security of both law and order. Emigration was fostered. The rich, leisured classes of the Roman people, many of whom had been educated in Greece, paid regular visits to Athens and the great festivals. Others made tours to Egypt. All this traffic of the seas was only possible because the Roman power was unchallenged. It was this commercial interchange and tourist traffic together with the admiration and respect for the Greek culture which spread its influence through the Roman Empire in a Græco-Roman civilization.



The Roman Trireme, circa A.D. 100

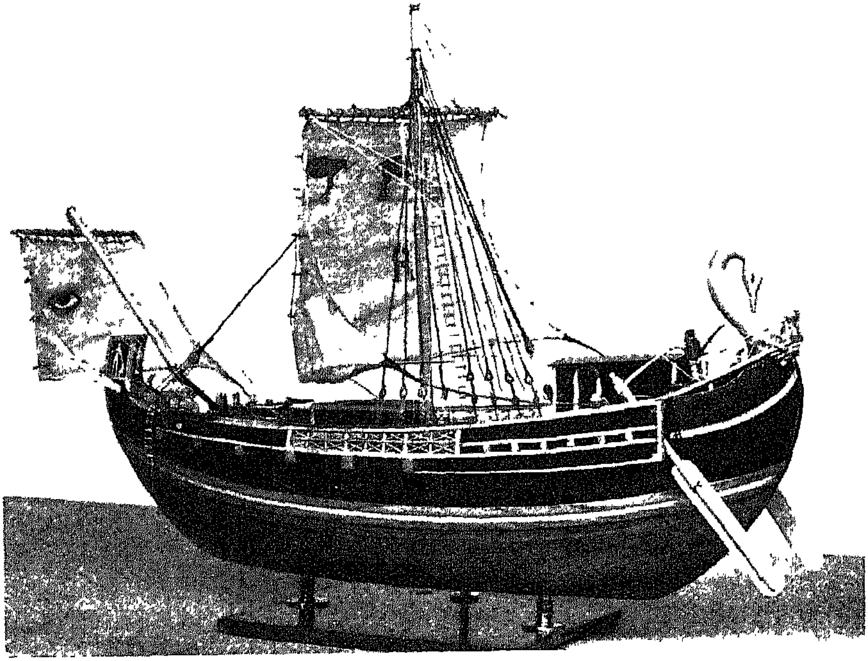
Shipbuilding flourished. The Roman corn-ships, round unhandy boats, had a carrying capacity up to 250 tons and were as big as ships built in the seventeenth century for overseas trade. Even larger ships were built, for the Vatican obelisk, which was transported from Egypt about A.D. 40, weighed nearly 500 tons. Roman architecture is characterized by its size and magnificence, and this same assertiveness led the Roman shipbuilders to build vessels far bigger than had been built before. House-boats, packet-ships for short sea passages, large corn-ships sailing in convoy, merchant ships bound for the East, traders over the Mediterranean to Alexandria and Carthage all witnessed to a lively shipbuilding industry. We know little of the time occupied in making a passage, for most of the journeys were in short hops from port to port, but it is on record that a passage was made from Rome to Alexandria in nine days, and the corn-ships from Alexandria steering a direct course for Ostia, the port of Rome, did the trip in favourable weather in about nineteen days.



A MODEL OF A ROMAN SHIP (CIRCA A.D. 50)

The Indian services took advantage of the monsoons, and while navigational instruments were still very primitive the cartographers like Marinus of Tyre, and Strabo were making maps. All overseas sailing was undertaken during the summer months, and only in grave emergencies did the corn-ships venture during the winter. Ptolemy, of Alexandria, an astronomer and mathematician who lived about A.D. 150, deserves mention because of his map of the world. His system of geography preserved unquestioned authority down to the fifteenth century, and his theory probably did more to prevent ocean exploration than any other concept.

It is a graphic description of a journey by sea in a merchant ship that is given in the New Testament (Acts xxvii), and in its detail it bears the stamp of authenticity.



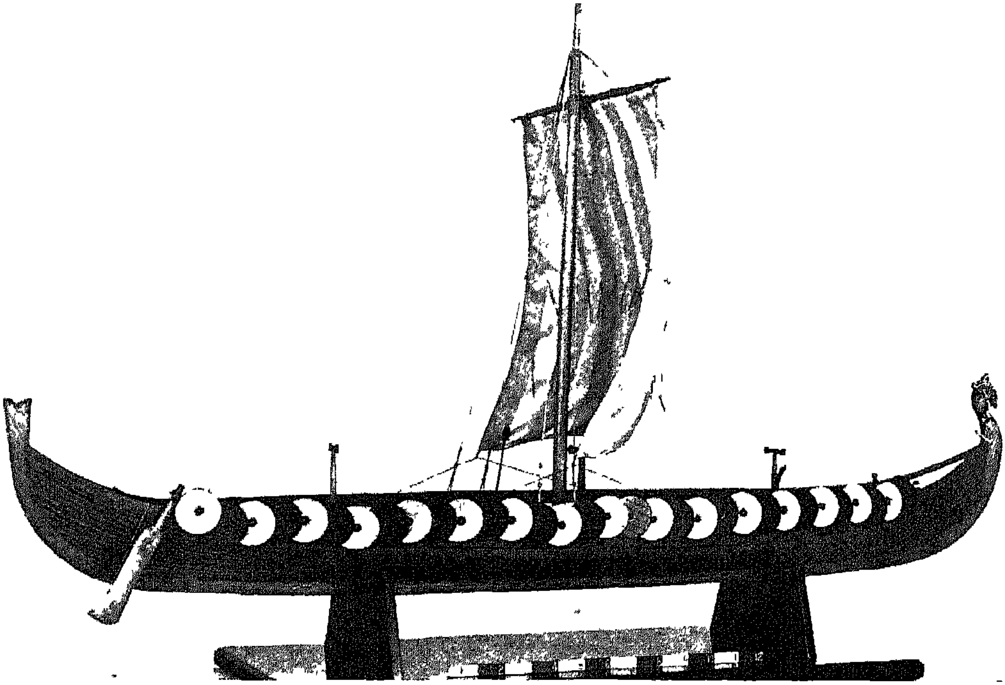
A Model of a Second-century Roman Merchant-ship

By courtesy of the Science Museum, South Kensington

The Apostle Paul, "a citizen of no mean city," had appealed to Cæsar, and the account of his experiences is both informative and interesting. He sailed for Rome in a "ship of Adramyttium"—that is to say, a Roman ship built at Adria by a closed society of Roman shipwrights. Later he transferred to a "ship of Alexandria," an Egyptian vessel probably nearly 150 feet long carrying over 250 people. "The wind not suffering us, we sailed under Crete," but after much dangerous navigation they put into haven and waited. "And when the south wind blew softly" they fared forth again, only to be overcome by storm and shipwreck off the island of Malta; but owing to Paul's good sense the whole ship's company were saved. The narrative not only reveals the discomforts and dangers of sea-travel, but the handicap these early ships had in not being able to sail against the wind.

The Ships of the Vikings

When Rome lost command of the seas at the beginning of the fifth century all the legions of destruction were let loose. They came from the dark North. It was the same bleak, wild, inhospitable land that bred the Vikings. They lived by the sea and on it, and they built ships, less round than the Roman grain-carriers of the third century, long, open, and light enough to ride the waves. The tall pine- and larch-trees in the forests afforded fine timbers. But they had not the constant reservoir of slave-labour to draw upon which was so marked a determinant of the Classic civilizations of the Mediterranean. To this we can ascribe their better seamanship. They almost certainly knew the art of tacking, or sailing against the wind on a zigzag course, and sail was an integral part of the ship. The boat was steered by a large oar, secured in a loop of leather on the steer, or starboard, side—that is, the right-hand—the position it had held

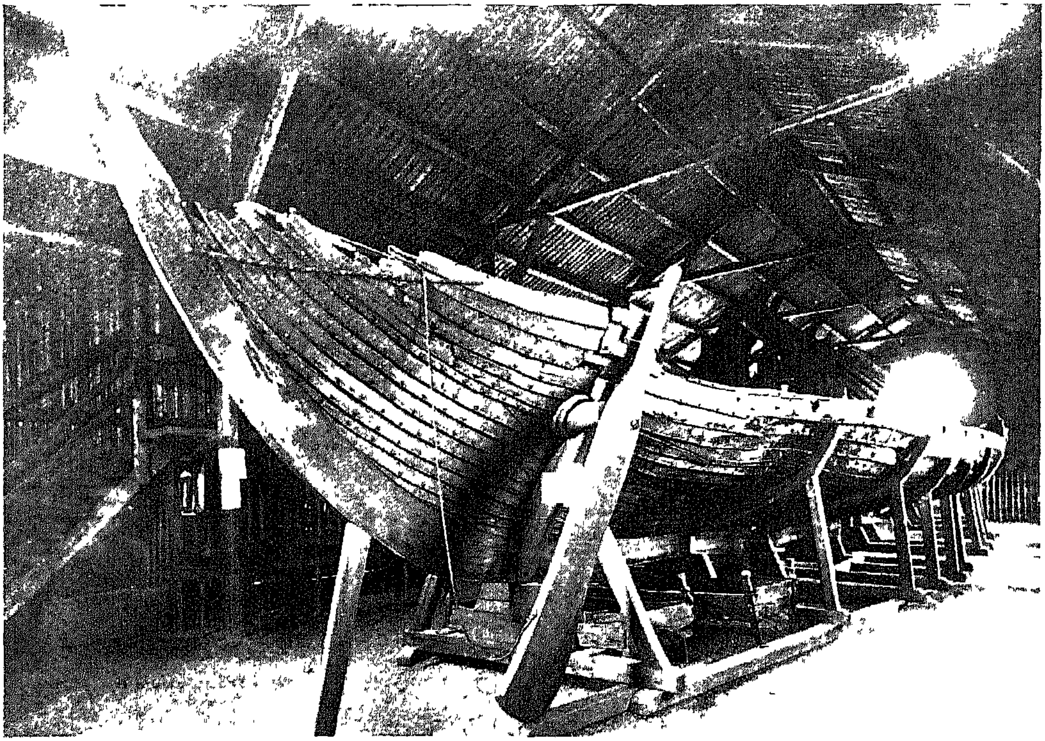


A Viking Ship (circa A.D. 900)

From a model in the Science Museum, South Kensington. Crown copyright

through the centuries. To avoid damage when grounding on a beach the end of the steering oar was pulled up by a rope of leather thongs. There were no cabins, but at night or in bad weather a tent was stretched. The rowing benches were at the sides, with a centre gangway, and the vessel carried one mast and a square sail set midway between prow and stern. The modern Norwegian fishing-boat owes its lineage to the Viking ship.

As we learn the life of the ancient world from the burial-mounds and tombs, so the funerary rites of the Vikings, who buried their chieftains in their boats, have given us an exact description of their ships. The remains of several of these Viking vessels have been found, but the most complete are the Gokstad ship, and that found at Oseberg, in the Oslo Fjord. They date, in all probability, from about the tenth century, though some authorities place them earlier. A discovery on the coast of Schleswig of a Viking ship which was in the museum at Kiel showed the planks fastened to the frames not by nails but by leather thongs. This method provided great resiliency in a sea-way. The modern method of boat-building is to fix the planks before the frames.



THE VIKING SHIP FROM GOKSTAD (STARBOARD QUARTER), CIRCA 900
This ship is now in the Norsk Teknisk Museum at Oslo.
By courtesy of the Science Museum, South Kensington

The earliest surviving example of Northern shipping of the first ten centuries A.D.

is the Nydam boat, which probably dates from the first century A.D. Its construction has many interesting features. The hull has a bow and stern which are exactly alike. This double-ended shape is quite different from the design of the Mediterranean ships, and is a marked characteristic of Viking vessels, which evidently derive from this earlier boat-construction. Her planks, which are fastened together to the stem and stern-post by copper or bronze nails, riveted over rooves, or washers, on the inside, as is the practice even to-day, are clinker-fashioned. The nineteen ribs are lashed to projecting inside clamps, just as in the fragmentary remains of the Brigg boat found in the Humber. This suggests that the ribs were fixed after the planks had been put together. It is fitted with fourteen rowlocks and carries no sail. The rudder is obviously derived from the primitive paddle, but there is a curious handle at the top which served as a rude form of tiller. She is 76 feet long, 11 feet wide, and amidships is 4 feet deep. Her stem and stern-post rise 10 feet above the line of the keel. This sheer is another characteristic feature of the Northern vessels. It is the sharp rise forward and aft that was the secret of their seaworthiness.

The finds in the Oslo Fjord of the Tune boat, discovered in 1867, and the Oseberg boat, recovered in 1903, and the other recognizable fragments of boats, some of them capable of almost entire reconstruction, unearthed from burial-mounds on the Scandinavian coast, all belong to the Viking days. It is a span of six centuries from the Nydam boat to the Viking galley, but the characteristic features of the sheer, the double-end, and the clinker construction remain. Just as the Pyramid age in ancient Egypt has informed us so richly of the arts and crafts of that remote period, so too the excavations of the burial-mounds of these Viking sea-warriors have given us our knowledge of the appearance and construction of their ships. It has been possible to build replicas almost exact in every detail. One of these replicas, the *Roald Amundsen*, said to resemble closely the ship in which Leif Ericsson voyaged from Greenland to America about the year A.D. 1000, was sailed across the Atlantic. It took fifty-three days to make the crossing.

The Oseberg boat has a real keel like a modern boat, and the mast is stepped a little in front of the middle of the ship. The foot of the mast rests in a hole in a large block of wood lying on the keel, and it is held in position by slots over two of the ribs. Supported from in front and from the sides the mast was left free to fall aft, though a temporary strut held it firm while the sail was in use. The bow was beautifully carved. This decoration is the clue to the date, which has been fixed at approximately A.D. 850. The Oseberg boat was 70 feet 6 inches long, 16 feet 9 inches wide amidships, and along with the 'Gokstad ship,' found at Gokstad, near Sandefjord, is one of the best-preserved remains of Viking galleys. Viking rowers were free warriors, and not slaves as in the Mediterranean ships, rowing standing up and facing forward with their shields hanging on the gunwale beside them. These shields long afterwards survived in the form of decoration as paviasses.

The Gokstad remains were found in the blue clay—an excellent preservative—in 1880, and a model of the original vessel at Oslo is in the Victoria and Albert Museum, South Kensington. It is intensely interesting as showing, like the Oseberg find, exactly what the boats of these Norsemen were like. The boat was found buried in a mound, 18 feet above sea-level, with her prow pointing to the sea. Her length overall is 79 feet 4 inches, beam 16½ feet, and depth amidships 6 feet, her gunwale is 2 feet 11 inches above water amidships, but 6 feet 6 inches at bow and stern. She is beautifully modelled under water, and well designed. She is clinker-built, not carvel, and has room for a crew of ninety men.

Pirates all were those bold, hardy, ruthless Viking sea-rovers. Ibsen, the great Norwegian dramatist, who drew so much inspiration from his native sagas, has vividly re-created them in *The Vikings of Helgeland.* How much the craft of sailing the sea owes to these barbarians! Speed, manœuvrability, and seaworthiness are the trinity of a vessel's virtues; and these were all important in the pursuit of their nefarious business. Farther and farther they ventured—north into the Arctic Circle, west to the coasts of North America, south to the Mediterranean, out into the wide, uncharted ocean—for there was no Ultima Thule beyond which they dare not try to reach.

Argonauts of Progress

Behind all progressive invention lies the law of necessity; yet there is another and more profound spur in the divine unease, ever restless to know and conquer. Man is not only a seeker of facts, a vandal, and a greedy acquisitor. He has the spark of heavenly flame in his breast. The eternal mystery beckons. Rivers and sea are highways. Whither do they lead? To the Hesperides and the lands of gold? So from time immemorial he sails the unknown water—the Papuan with his raft, the Pacific islander with his outrigger, the Celt with his coracle, the Eskimo with his *kayak*, the Red Indian with his canoe, the Chinese with their sampans and junks, the Greeks and Romans with their galleys, the Vikings in their drakaars not only for plunder but for a dimly felt vision. If you do not believe this look at the decoration and ornament on their boats and paddles, and search their legends. There you will always find a tale of Argonauts sailing heroically after the Golden Fleece.

CHAPTER II

THE MIDDLE AGES

(800 TO 1500)

Definition of the Period—The Invasions of the Barbarians—Reasons for the Blank in Shipping Progress—Sources of Information about Early Medieval Ships—First Changes in Structure—Improvements in Rigging—Rediscovery of the Artemon—The Crusades and their Influence on Ships—The Italian Maritime Republics—The Persistence of the Galley—The Introduction of Gunpowder—Beginnings of Scientific Navigation—Size of Ships—Conservatism of Shipbuilders—Picture of Fourteenth-century Shipping—Some Results of the Levantine Trade—The Art of the Shipwright—The New Era of Exploration and Expansion and End of the Medieval Order.

> The joys and sorrows sailors find,
> Coop'd in their wingèd sea-girt citadel.
>
> BYRON, *Childe Harold*

> He hath an argosy bound to Tripolis.
>
> SHAKESPEARE, *The Merchant of Venice*

HISTORY has neither a beginning nor an end. There are no abrupt transitions, only slower or faster currents in the sea of change. But for the convenience of study it is the historian's practice to mark it off in periods, not without logic, for there are stages in which the movement is accelerated or retarded so perceptibly that they are clearly turning-points in human history. The sack of Rome by the Vandals in the year 455 set the term to one period. The fifteenth century, with its brilliant expansions of the mind and of the activities of men, opens another era.

Between these two points in time stretch the Dark Ages of transition from the old Græco-Roman order to that great period opening about the year 1000 known as the Middle Ages. One of the chief characteristics of the medieval world, in sharp contrast with the eras that preceded and followed it, was its passivity. The Greeks and Romans were continually moving outward, establishing their colonies and opening up new trade-routes. They were restless and adventurous and migratory. The fifteenth century marked the revival of this aggressive activity, this outward drive, and the exploits of Columbus, Vasco da Gama, Magellan, Cortez, and Pizarro belonged to a new order.

The Invasions of the Barbarians

After the collapse of the Roman Empire the movement reversed and turned inward. Rome, with her decayed aristocracy and degraded populace, and her weak Central Government, was no match for the vigorous barbarians in the North. As she fell back from her fortresses, losing her controls, the hungry swarming of the barbarians began, and for centuries this migration continued. But the era of the *Völkerwanderungen* through the Roman provinces was haunted by the memory of conquered Rome. Had not Rome's laws and language, her commerce and her envoys, overspread the world? Had not adventurous Germans served as mercenaries under the Roman Cæsars? Her splendour and fame dazzled the rude tribal mind. Thus, when the final movement came, the Teutons, establishing their colonies, tried to preserve something of what they found. The complex machinery of administration won their respect, the impressive architecture aroused their wonder, the stately ceremonials of Christian worship compelled their reverence. Apart from the Mongol Attila, whose terrible hordes spread their vandalisms without mercy or restraint, the Gothic invaders were not destroyers. Rome held them under her spell.

The incursions of the Vikings from Scandinavia and the Baltic were part of this folk wandering. Though their coasts faced north and west it was to the Mediterranean they were drawn. The more hospitable lands of the South were richer to plunder. They raided all the western shores of Europe down to Spain, and swept into the Mediterranean. The first recorded raid on England was in 789. They wrested half the kingdom of Alfred the Great (886) from him, though he built himself a navy, which, according to the *Anglo-Saxon Chronicle*, was "swifter and steadier and higher than the others," but lacking skilled sailors he had to engage mercenaries. What great sailors these Norsemen were! Perhaps the greatest the world has ever seen. They colonized Iceland, and in the tenth century maintained a regular service from Denmark, demanding for such navigation accurate observations of latitude. Leif Ericsson in the year 1000 and probably Biarni Heriulfson in 985 in their Viking ships reached the shores of North America by skirting Greenland. They pierced France and Germany by their rivers, burning and pillaging. They fell upon Provence and Italy, and under their leader, Rurik, gave Russia her first hold on the Black Sea.

This period was indeed the nadir of order and civilization. Charlemagne, the Frankish king, had stemmed by his strong hand the tide of these barbarian invasions and crowned himself Emperor of Rome in 800. He created a vision of a new order and unity, in the chaos of these Dark Ages, through a universal Christian empire; but not yet could it be fulfilled. Following his death Wends and Czechs, and savage Hungarians from the Caspian steppes, carried terror and pillage down to the Apennines; Berbers and Moors wasted the Mediterranean shores. The dreaded Viking long ships sailed the seas. All the bandits converged on the Mediterranean. Amid this anarchy, confusion, and strife there was a passionate yearning for peace. The two enduring forces in the Roman legacy were her Church and her Law, and only these could cement anarchic Europe. When the German prince, Otto the Great, subjugated the surrounding nations, advanced to Rome with his conquering Saxons, and was crowned by the Pope in 936, the great dream of Charlemagne of a united Europe was revived.

In the Holy Roman Empire the Pope, as God's vicar in matters spiritual, and the Emperor, as vicar on a lower plane in matters temporal, stood at the head of Church and State, which in conception were one. The Church was Europe, and Europe was the Church. Unity was achieved through a flexible framework of administration, permitting each nation to keep its own leaders and laws so long as the overlordship of Rome was acknowledged. Wars were waged to compel the recalcitrant Danes, Magyars, Czechs, Berbers, and Arabs to come within the Empire, and baptism was the badge of submission. The manifold polytheisms of the pagan religions melted into an all-embracing Christian faith. The confusions of tribal existence were resolved in the social and legal order of the feudal system. The basis of feudalism was subordination, and its practice demanded personal service to an overlord. Not independence but submission was proclaimed the first of the virtues. The ethical accent was thrown, not upon self-realization, but upon self-repression. In his relations with the Church, State, or Guild, medieval man was merely a unit in an organization. The totalitarianism of Christendom, with its rule of obedience, provided the solution to the European disorder. All roads led to Rome, but as highways of pilgrims and traders. The Mediterranean was the "middle sea," and over its waters we find the principal traffic-lanes of medieval shipping.

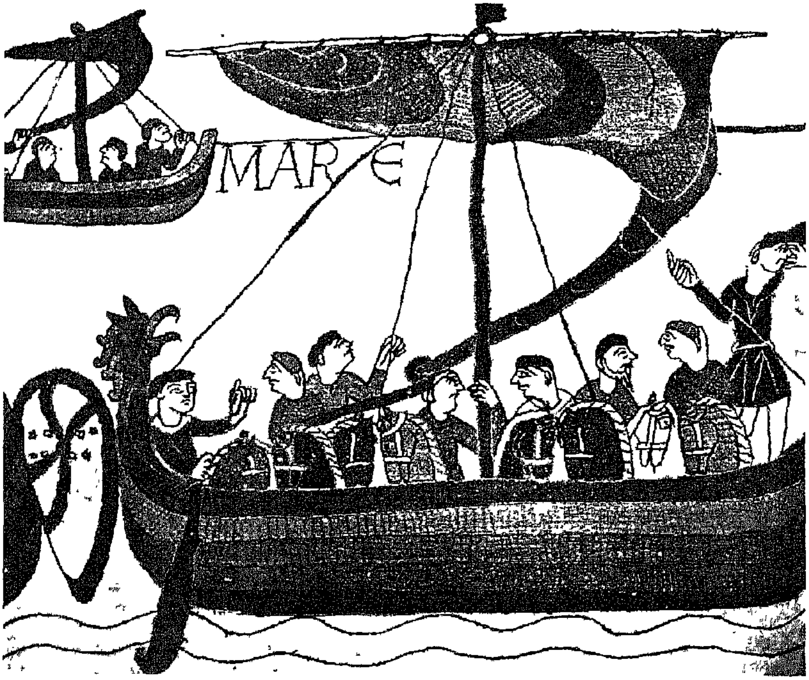
It is not to be expected—and we do not find—that any significant advances or innovations in ship-construction took place during the turbulent transition of the Dark Ages. The invading barbarians, for the most part, were occupied in loot and pillage, and their activities were mainly destructive. There were elementary trading efforts, and attempts at organized settlement with the purpose of following peaceful pursuits, but conditions were too unstable and insecure. The accomplished craftsmanship of the Greeks and Romans was lost. The Roman corn-ship had attained a size and a degree of perfection as a carrying vessel, both in its design and rig, that was not recovered till the fourteenth century. Just as they lost the art of building temples and churches, they lost the art of building big ships, which the Romans had so well understood. They lost too the skill in rigging, and the *artemon,* or bowsprit, with its small spritsail, so useful in enabling a vessel to sail with a beam wind, disappeared altogether. The traditions of civilized Rome echoed on, but it was centuries before the later shipbuilders recaptured them.

All they could do was to follow the way of their forefathers and to repeat the same tried methods of construction, refining as experience taught them. There were no creative inventions. The ships of William the Conqueror in 1066, depicted in the Bayeux Tapestry, are practically identical with the Norse galleys in the time of Canute, two centuries earlier. There is little difference in the design and method of construction in the double-ended hulls of the Northern ships of A.D. 100 from the Viking galleys a thousand years later. The galleys of 1200 are longer, finer built, with almost scientific lines, but the hulls have been developed along traditional grooves. There is no appreciable difference between the Viking ships of 900 and 1100. The Norsemen, for all their genius in seamanship, were unable to create anything more. All these Northern ships were clinker-, or clincher-, built, with high, carved figure-heads and sternpieces, and they carried one square sail of animal's skin.

It was the savage canon that men should carve and decorate. It was an instinct and not borne of knowledge. We found it in the prehistoric caves and on the oar-blades of the first boats. We found it on the Scandinavian long ships and the Norman vessels which derive from them. They decorated what they loved. Does not that show where the kingdom of the arts is to be discovered—not in the intellect but in the heart? The Vikings sailed in far-distant seas and met Mediterranean ships built in a completely different tradition, yet they remained uninfluenced. The Vikings, whose warrior freemen played such a part in the break-up of the old Roman Empire, were barbarians, and they suffered the primitive's limitations.

The Revival of Trade and Shipping

Not until piracy gave way to trade, anarchy to order, and barbarism, with its precarious existence, to a civilized way of life would the craft of the shipwright get out of its repetitive forms. Medievalism, with its emphasis on tradition, was not calculated to stimulate independent thinking; but from the eleventh century onward the historian can trace the feeble workings of opposing forces which reached a sudden spring-time in the precocious thirteenth century.



A Detail from the Bayeux Tapestry
By courtesy of the Science Museum, South Kensington

The age of Roger Bacon and Dante, of the founding of the universities, and of the flowering of art and architecture did not fail to leave its impress on the common activities of men. Shipping and trade began to revive. Seaports grew and were established along the European coasts. Active trading confederations were organized along the shores of the Baltic and in the Mediterranean. The Crusades brought remote Europe, with its drab rude existence, into contact with the colour and civilization of Asia. In Europe people wore homespuns of wool and worsted, in the East there were silks and velvets. The cardinals and princes lived in grim castles, the rulers of Asia in palaces. European towns were huddles of wooden houses, in the East were well-planned cities. These treasures of the Orient excited men's minds. Shipowners, mariners, and merchants saw new fields of commerce. The business of shipowning was regularized. The Guilds, which had remained mainly religious in character, exercised their influence in the interest of the workers. Apprenticeship improved the standards of craftsmanship. The Merchant Guilds encouraged co-operative owning and trading, and civic interests became alive. Because it was in Italy, with its communes, or free towns, of the twelfth, thirteenth, and fourteenth centuries, that there was the largest measure of political and religious freedom and of industrial activity—Italy that met the demand of the Crusaders for transport—it is to the Mediterranean and the shipping activities of the Italian maritime republics that we must look for the busiest traffic of the seas.

Yet it was in Northern waters that the first important and decisive change in ship-construction took place. This was the introduction of the stern rudder. The earliest known certain representation of a rudder hung on a stern-post, as distinguished from the steering paddle or oar lashed to the starboard quarter, is that on the seal of the German seaport of Elbing, which dates from about 1242.

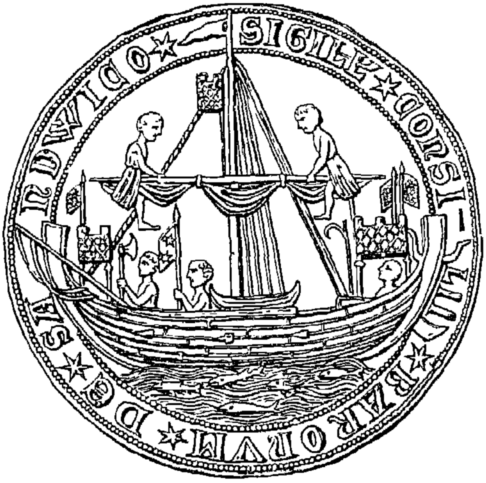
Such information as we do possess of the first medieval ships comes from decorative stone carvings, or from representations on the seals of seaport towns; and these are none too reliable as sources of accurate description. Both stone carver and engraver are less concerned with meticulously accurate drawing than with composing a pleasing pattern, while the circular shape of the seal imposes constrictions in design.

A much disputed, but interesting, carving of a ship with a stern rudder is to be found on the font in Winchester Cathedral. It is generally attributed to a Belgian sculptor and dated approximately 1180. There is some doubt, owing to the position of the decorative beast's head, whether the rudder is directly attached to the stern-post, but the presumption seems to be justified. The seal of Poole, dated 1325, definitely shows the side-rudder, or paddle, of the ship moved to the stern. This is a complete break with tradition. The side-paddle had kept its position from time immemorial, but now it has taken up its logical place on the axis of the ship at the stern. The steering oar is still carried by ships' lifeboats for use in bad weather when a rudder becomes useless.

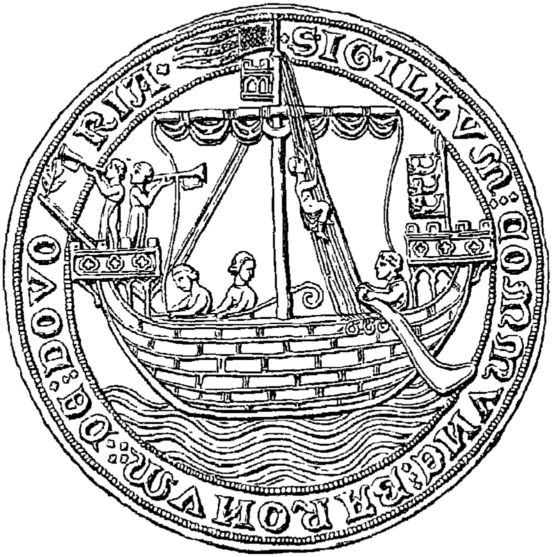
A straight stern-post meant that the high, curved stern had to go, and with it the double-ended ship. Stem and stern are now distinct. It was the first of three steps in the evolution of the galley into the true sailing-ship. The other two are the introduction of the bowsprit and the deeper hull.

Sailors in the more exposed Northern seas had learned to use sail more efficiently than their fellows in the Mediterranean, chiefly because there was not the supply of slave labour; and by the eleventh century they could employ a beam wind. Probably the Vikings knew the art much earlier. But in so doing the disadvantages of the side-rudder must have become apparent. A wind to starboard would tend to lift the oar out of the water as the ship heeled, while a wind on the port side would dig it in so deep that to use it would endanger snapping it. Placing the rudder at the stern provided the solution.

Now that it was possible to use a side-wind other problems arose. To control the flapping sail and hold it in position ropes had to be used. Thus we get the bow-lines which were secured to the bowsprit, the long rising spar which projects beyond the vessel's bows. There is a rudimentary suggestion of it on the seal of Sandwich struck in the thirteenth century; but as yet it was merely a convenience for attaching a rope. Two centuries had to elapse before the true bowsprit, carrying its own sail, appeared.



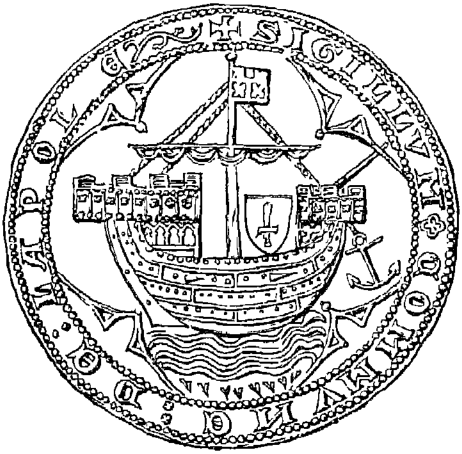
The Sandwich Seal, 1238



The Dover Seal, 1284

Another interesting feature of the engraving on the seal of Poole is that it shows the ship with castellated structures fitted fore and aft. The castles were temporary additions to merchant ships, for the use and protection of archers in battles. In these medieval times sea-battles were fought with the same strategy and tactics as land-battles. Still, besides converted merchantmen, regular battle-fleets were maintained. King John possessed a considerable galley fleet in England, and the dim beginning of the Admiralty was in the organization to take care of them when they were drawn up on shore between the wars. The forecastle, or fo'c'sle, in the modern ship, though nothing could look less like a castle, owes its origin to this medieval improvisation.

By the end of the thirteenth century the single-masted ship in Northern waters, which had been evolved from the Viking galley, had progressed to its limit. It was a ship fitted with a square sail on a centre mainmast and in shape rather high and narrow. It carried a stern-rudder fitted to a stern-post, and the stem was curved, while the stern was straight. The hull was deeper draughted. By the fourteenth century this was the common type of sailing-ship in use in the North. In the South, however, the two-masted sailing-ship was general, but the foremast was the bigger, and it carried a completely different kind of sail. This triangular sail, peculiar to Mohammedan shipping, was probably introduced to the Mediterranean by the Arabs in the seventh century, and it was so generally adopted that even to-day it is the characteristic sail. This lateen sail, or lug sail, which the Arabs used on their *dhows* and *feluccas* and other Mediterranean craft, had one big advantage over the Northern square sail. It was at its best when the square sail was at its worst—that is, when there was a beam-wind beating across the ship. The square sail, however, was superior to the lateen when the wind was right aft.



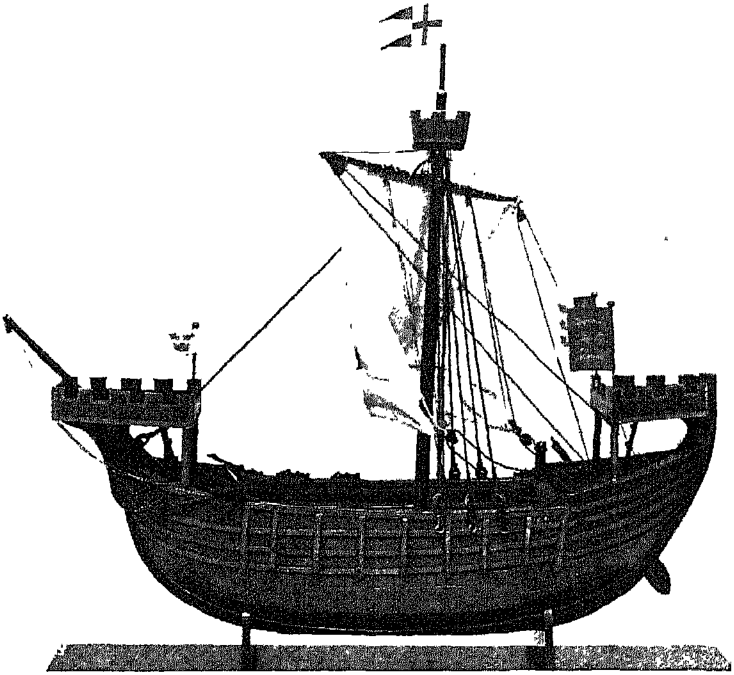
THE POOLE SEAL, 1325

The mizzen, mesan, or mizeen, mast, as it was variously called, was the second mast, and the name comes from these Arab twin-masted lateeners. The two-masted lateen rig has persisted down to our own time in small ships sailing in the Near East and around the Persian Gulf. This lateen sail is found in the East Indies and in the Pacific, and the probability is that it originated in China, though some authorities ascribe it to Egypt. The Saracen invaders in 640 took it with them on their more distant conquests, but it was not introduced into North European waters till the beginning of the fifteenth century, during the transition from one- to three-masted ships.

The two-masted ship was never popular in Northern waters for two reasons. First, it was too big a break with tradition to be favoured, for ever since ships carrying sail had been built the single mast had been rooted in the middle of the vessel. Tradition is not easily uprooted, so when the idea of more than one mast was entertained it was inevitable that there should be three. Second, the effects of wind-pressure had not been sufficiently studied, and the size of the sails adjusted accordingly, with the result that the vessel was ill-balanced and constantly flew into the wind.

Though the triangular sail was that in general use in the Mediterranean, there was also a square-sailed type of vessel in these waters during the twelfth and thirteenth centuries, differing from the others only in its rig. This square-rigged Mediterranean ship probably derived from the Roman merchant ship, and not from Northern vessels. All these Southern vessels were carvel-built.

It will be remembered that the Roman *artemon*, or short foremast, had disappeared in the Dark Ages. It emerged again in the fifteenth century. This dramatic rediscovery was in keeping with the revived interest in all things classical, especially in Italy at this time. The communes, or free towns, of the twelfth, thirteenth, and fourteenth centuries, vigorous and independent, differed greatly in outlook and spirit from those north of the Alps. There was not only an immense development of industry and trade but a habit of mind hostile to dogmatism and alert with curiosity. Mutual rivalries and internecine controversies served to sharpen the intellect and intensify a zest in life itself. Unrestrained, passionate, eager, such people were not content to remain marking time.



A SHIP OF THE CINQUE PORTS, THIRTEENTH CENTURY

From a model in the Science Museum, South Kensington. Crown copyright

The energies which medievalism had absorbed in the pious contemplation of eschatological visions now spent themselves in practical affairs. One of the first signs of this changed temper and outlook was the newly awakened interest in the recovery of the masterpieces of pagan antiquity. The sailor would be naturally attracted to those particular features which had a supreme interest for him. More than likely some Genoese or Venetian mariner observed the *artemon* on a fresco or a vase decoration during his travels in the Ionian Sea and applied it. Thus we get the bowsprit, the yard which reaches forward over the bow of the ship, and the spritsail, a square sail fitted to it, hanging nearly to the water-line. This fifteenth-century spritsail must not be confused with the sail of the same name used with the fore-and-aft rig of a Thames barge. It was just a head-sail with a balancing effect on the ship.

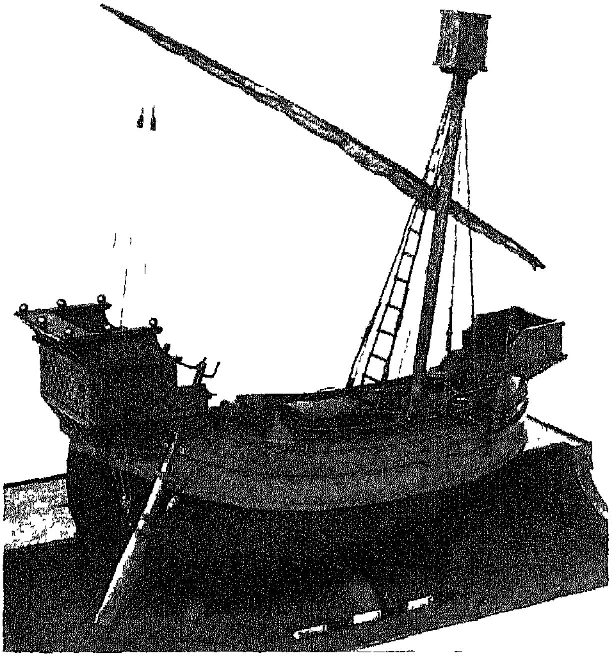
A development of importance followed this increase of sail. Shallow draught was essential in a ship propelled by oars, but the greater use of wind-power led to deepening the hull of the vessel to gain stability. It also led to an increase in the size of ships. The Saracens were building big ships in the time of Richard I, and the account of the attack by his fleet on a 'dromond' near Beirut, in Syria, in 1191 told of a three-masted ship carrying one thousand five hundred men. This was probably an exaggeration, but there can be no doubt of the astonishing impression she left on the minds of all who saw her. She must have been considerably larger, and better found, than any ships known to Richard's men. Her tall sides presented great difficulties to her assailants in their smaller and lower boats. We do not know her rig, but she was probably fitted with lateen sails. Incidentally, this engagement was one of the few on record where a king commanded in a naval battle. This dromond was finally rammed by galleys and captured.

The Influence of the Crusaders

Emphasis must be stressed on the influence of these Crusades; for these religious expeditions, originating in fanaticism and the medieval love of fighting, had effects far beyond the aims of the Crusaders. They not only aroused a taste for travel but also offered fine commercial opportunities. They stimulated secular interests and activities, created new tastes and demands, and, by bringing the Western nations into contact with the completely different conceptions of the East, tended to widen men's minds. Commerce is the foe of feudalism. Bred in the atmosphere of theological intolerance, these Crusaders set out to drive forth the 'paynim,' the brutal savage, from the Holy Land, only to find that the Mohammedan enemy was enjoying a civilization with courtesies, refinements, and comforts far superior to their own. Saracenic ideas inspired the institution of the Knights Templars. Scott, in *The Talisman*, portrays Saladin as a courteous and tolerant prince.

The need for transport by the Crusaders, and the growing volume of trade which followed, gave a tremendous impulse towards ship-construction; bigger and better ships for this overseas trade with the Near East and the consequent enrichment of those engaged in it. Italy was strategically placed to capture and command this lucrative business. The democratic maritime republics in Venice, Genoa, and Pisa seized the opportunity. Feudal Naples awoke to the business of ships. There were also maritime centres at Marseilles, in France, and Barcelona, in Spain.

The Crusaders not only needed ships for transport and supply—they needed warships to fight the Saracens. The Italian republics concentrated on meeting these requirements and demanded not only money but monopolies; the exclusive rights of trading with the captured Syrian ports. Thus they succeeded the ancient Phœnicians and Romans as the distributors of the produce of the East; they became the carriers and middlemen enjoying unrivalled prosperity. It is not surprising that in the fifteenth century, that great century of the flowering Renaissance, there was a swift and momentous change in the building of ships. It was a great era of architecture. In the space of fifty years the seagoing sailing-ship developed from a single-master into a three-master carrying five or six sails. Then there were the celebrated Venetian merchant galleasses, which combined the functions of the war-galley and the merchantman. The Genoese built 'carracks,' broad, deep sailing-vessels that carried a good deal of the Mediterranean trade, and, with the Venetian wine-galleys, the Flanders galleys, sailed to London and Southampton with their holds full of Eastern produce, returning with cargoes of English wool. There had been regular annual visits from the Mediterranean ever since the twelfth century.



A Model of a Mediterranean Ship, Fourteenth Century

By courtesy of the Science Museum, South Kensington

The Carrack

The carrack was not peculiar to Genoa. The Spanish, Portuguese, and the Dutch built carracks, but the carrack reached her prime at Venice and Genoa in the fifteenth century. A distinguishing feature of the carrack was the overhanging forecastle mounted on a high fore-deck. Similarly an after-castle, or 'summer-castle,' hung over the stern.

The deck was not continuous, but broken into three portions—bow, waist, and stern. The waist for the cargo was a low deck. The mainmast of the ship was much the largest. The foremast mounted on the fore-deck was usually larger than the mizzen, mounted on the after-deck. The mainmast in the centre carried a large square sail, the foremast a small square sail, and the mizzen mast a lateen. The ship had a stern-rudder, and in this feature the experience of North and South was united. It continued generally to be carvel-built, the sides being strengthened by wales. In contour she was blunt-ended and wide-beamed, the stern differing from the bow in that it was squared off at the top, and below this hung the stern-rudder hinged to an upright stern-post, the inner side of which was shaped to fit the hull and to continue to the keel. In the absence of precise information, the size of fifteenth-century ships' dimensions has to be received with caution. R. and R. C. Anderson, in their history of the sailing-ship,[1] cites one as measuring 85 feet long on the keel. This five-hundred-ton carrack was about 125 feet from stem to stern-post and 34 feet wide. Carracks varied from 200 tons to 600 tons in the fifteenth century. At the end of the sixteenth century Portuguese carracks running to the East Indies went up to 2000 tons. This, of course, represents burden, or carrying capacity, not displacement, whether light or loaded. What is so remarkable about these ships is their wonderful development. They do not stand so very far distant in point of general structure and rig from the ships of Nelson's day.

To protect these merchantmen from pirates, and to keep out interlopers trying to steal some of this profitable trade, war-vessels were built. In the Mediterranean the galley was favoured. The carracks visiting the Levantine ports were covered by war-galleys as they returned, laden with riches, to unload their cargoes in the warehouse cellars of Genoa and of Venice. Their cargoes were slowly distributed all over Europe. Venice, "Queen of the Adriatic," became a major European Power, and the Doge a prince whose friendship was courted. The caravans from Venice crossed the Brenner to the thriving Baltic towns. The caravans from Genoa crossed over the western passes to the Rhône and the great Burgundy and Champagne fairs. All northerly routes led to Flanders, where woollen cloths and linen were collected for the return trip, while from the Hansa merchants on the Baltic they bought timber, hemp for ropes, heavy metals, and dried herrings.

Arab seamen brought the Eastern goods by ship from the Malabar coast to the Persian Gulf, and of those voyages fantastic tales were told of undreamed-of splendours and wealth. The overland route by way of the Desert of Gobi led through fabled Samarkand to far-off Cathay. The imagination of Europe was stirred by the tales of Marco Polo, the Venetian traveller who set off in 1271 on his adventurous journey and visited Kubla Khan, the Tartar Emperor of China. In the fourteenth century the reputed travels of Sir John Mandeville to the Far East were even more popular, though this Liége physician who died in 1372 gathered his material from many sources and probably never travelled at all. The crusaders had themselves seen the luxuries of the Saracens and returned with fine robes and a taste for Oriental products. The ships of Genoa and Venice practically monopolized this trade. The magic wealth of the East drew the eyes of Europe.

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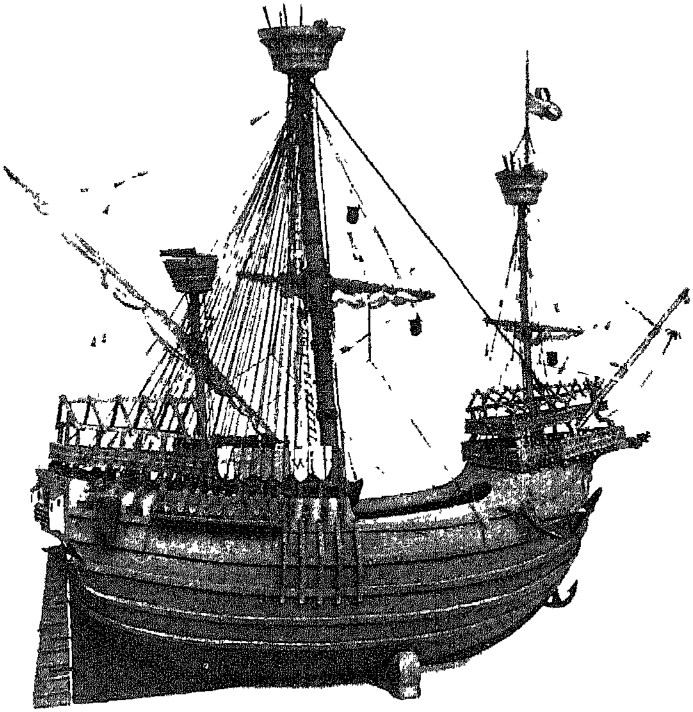
[1] *The Sailing-ship* (Harrap, 1926).

The Venetian galley-fleet swept the seas. Her merchant princes, with all the resources of the city state behind them, exercised every pressure to extort privileged terms of trading. She held the East in fee at the height of her power, conducted her commerce with ruthless efficiency and protected it by her war-fleet.



A Model of a Flemish Carrack (circa 1480)
Science Museum photograph. By courtesy of H. Morton Vance, Esq.

The Galley

The galley was a formidable warship. The Roman tradition played its part in determining this form of oared vessel. In the sheltered waters of the Mediterranean it was superior to the sailing-ship in speed and manœuvrability. The slave-markets provided ample reserves of labour. Beautifully designed, sleek, and finely proportioned, in "fitness for purpose" Venetian galleys were finer than their classic forbears. They were worked by two or three men to an oar, sitting side by side on the same thwart, or bank, in the manner of the ancient Greek and Roman biremes and triremes. By reason of its efficiency the fighting galley survived the invention of gunpowder, and for centuries carried a very heavy gun armament on the forecastle. The aftercastle was a poop for the officers. The long voyage merchant galley was fitted usually with two masts. The small mast was fixed at the forecastle, while the big mainmast was stepped in the centre. The story of the Italian wine-galleys which ran regularly to England and Flanders is itself an odyssey. The fighting galley reached its zenith in the fifteenth century. When Sultan Solyman I in 1523 drove the Knights Hospitallers out of the island of Rhodes, and threatened to spread his Turkish dominion over Europe, the combined Christian galley-fleets of Venice, Genoa, Pisa, and Spain, under Don John of Austria, shattered the Infidel's naval power at Lepanto in 1571. But the Mediterranean Powers were already in decline. Shipping was now buffeting its way in the Atlantic. The oared galley was supplanted by the galleass, a sort of frigate, and the galleon because it was not suitable for heavy seas.

The Mediterranean long ship, or galley, with its pointed ram-bow, reaches back to Egypt and the Minoan Empire in Crete some 2000 B.C. The Phœnicians, who followed them as the great seafarers, developed it into the bireme, with the arrangement of oars at two different levels, but preserving the low bow, high stern, straight lines, and the ram. The Greeks, in their turn, increased the oar-power, if accounts are to be believed, to forty remes. This, in the end, defeated itself, for they ceased to be practical. It is true that sails were used wherever possible as a measure of economy, and the rig in many cases was quite elaborate, but the essential motive power was the oar. The Romans with their practical minds simplified the galley-manning to the bireme type, and with this handier vessel defeated the Carthaginians at Actium in 31 B.C. They *too concentrated on the galley as a fighting ship; their merchantmen depended on* sails. The medieval galley brought the oars to a single level, as in the original Greek vessels at their best. The bireme had two men on a bank rowing separate oars in groups of two. The trireme had groups of three oars each worked by three men. These oars were set along the outer edge of an outrigger, or *apostis*. The galley was also doomed in the Atlantic because the countries bordering those seas had no slave-market like those in the Mediterranean. But it definitely influenced design. The high poop and forecastle of the galleon derived from the fighting-castles in the Northern ships, but the beakhead was undoubtedly inherited from the galley.

Still the oared galley persisted even when it had become an anachronism. Why did it survive? The answer is found in the words of Burns—"man's inhumanity to man." For the galley degenerated from a warship to a convict ship. "To the galleys!" was a common sentence on prisoners in the time of Louis XIV. "Le Grand Monarque" they called this tyrant who basked with his mistresses in the extravagant luxuries of Versailles while he filled his prisons and galleys with wretches enduring unspeakable tortures. The seeds of the French Revolution were sown in the cruel splendour of his reign. "There is only one crime," wrote Flaubert, "—stupidity." Nothing else can explain the continued building of these heavily manned craft. Even slave- and convict-labour is uneconomic when it fills the boat.

The demand for ships meant also a need for skilled sailors and an increasing interest in the science of navigation. Though the voyages from Mediterranean ports to the Holy Land were comparatively short, with many stops among the Ægean isles, and it was possible to hug the coast, the navigator began to feel the necessity for some other means of finding his direction. More so still when he ventured beyond the Mediterranean into Northern waters. The invention of the cross-staff, a crude sort of instrument for measuring the vertical angle between horizon and celestial body in order to ascertain the latitude, and the astrolabe, which was adapted to shipboard by Martin Behaim in 1480, another device for finding the latitude, show the beginnings of scientific navigation. The mariner's compass, the use of which was now more general, was probably introduced by the Arabs who had become familiar with it in the East; for the Chinese "directed their ships to the South by the needle" in the third century. Again, without the telescope, which was not made effective until the early years of the seventeenth century, both navigation and the astronomical discovery which encouraged the early explorers, would have been checked. It was the development of the ship into a fully fledged sailing-vessel, together with these inventions, which made possible the great maritime explorations and adventures beginning in the fifteenth century.

What size were these boats engaged in the transport of the Crusaders? They were only like cockle-boats, rarely over 100 feet long "from stem to stern-post," and with a burthen up to 400 tons carrying capacity or dead-weight. The average ship was only about 200 tons. What these figures of tonnage really connote it is not now possible to say. Did they mean dead-weight or load-line displacement, or was the calculation based on the cubic space occupied by a tun of wine of 252 gallons in the hold? And how much free-board had they?

It may be as well, at the risk of digression, to explain what ship's tonnage really means. In the shipping world there is reference to several kinds of tonnage, and unless we understand the actual meanings of the terms the figures are confusing. What is the tonnage? Is it gross register, net register, displacement, or dead-weight?

The gross register is a tonnage of measurement and not of weight, and represents the ships's total cubic contents, including all structures, permanent or temporary, apart from the spaces specifically named above decks and the spaces reserved only for water ballast. These cubic contents are expressed in tons of 100 cubic feet. Different countries recognize different exemptions, so that this measurement varies slightly according to the ship's country of origin. The *net* register is the measurement of the cubic contents of the cargo or passenger space and excludes the space occupied by machinery and officers' and crew's quarters. The displacement is a measurement of weight, and exactly equals the weight of the water displaced by the ship, and it is usually quoted as either loaded or light according to whether the vessel is loaded or empty. The dead-weight tonnage represents the maximum carrying capacity of the ship and represents the difference between the ship's fully loaded displacement and light displacement. In all the early ships the calculation of tonnage was rough and ready and was usually based on the cubic space occupied by a tun of wine in the hold.

Conditions of Transport

Conditions of transport in such small vessels must have been appalling. Think of a cargo of these unwashed pilgrims—in these times a man was born, lived, and died without a bath—evil smelling, lousy, scrofulous; all huddled together on the decks of a rat-ridden ship, with a hold packed with merchandise and sour wine, with no fresh food other than that which could be got at ports of call, with the horses of the knight in armour included in the ship's manifest; and add to that mental picture the scenes of *mal de mer* on these rolling, rocking ships, and you will get some idea of the ordeal which had to be endured, moreover, at the price of the profiteering charges of extortionate owners. Yet Richard I preferred this to the journey overland. One thinks of the injunction in Dante's *Inferno*, "Abandon hope, all ye who enter here."

There were other miseries and horrors too—the attacks of pirates, robbery, and murder aboard ship, and the accursed slave-dealing of unscrupulous captains who sold their passengers. Shylock, in *The Merchant of Venice*, when told Antonio's ships were all on the high sea, knew their perilous chances: "There be land-rats and water-rats, water-thieves and land-thieves, I mean pirates, and then there is the peril of waters, winds and rocks."

There is nothing more conservative than the ways of sailors and ships. Tradition dies hard. The vocabulary of the modern seaman carries forward into an age of steam, internal-combustion engines, and electricity words as ancient as the Norsemen and earlier, and gathers them out of the ages to mystify the land-lubber. Abaft, astern, keel, deck, starboard, mizzen, forecastle, bowsprit, top-gallant—the examples could be multiplied. So, too, if we look at the boats on the narrow seas we can trace the persistence of historic types.

The Tyne keel, and the Humber keel, a form of lighter used to this day, dating from about the thirteenth century, are the oldest nautical relics of an English ship afloat that we possess. The Norfolk keels have only recently vanished from the Broads. The fishing-boats and lifeboats that are drawn up on the shore of our little sea-coast towns and villages are clinker-built like the Viking ships, and the modern Norwegian row-boat can be rowed in either direction as their Viking ancestors could. The Thames, or, more accurately, the Rochester, barge, now slowly disappearing, is as Dutch as she can be, and the modern yachtsman owes everything to the Dutch fore-and-aft rig, which is a square mainsail and a triangular foresail. Ships do not pass out of the vogue immediately a new innovation appears. There are still dirty old coasters in the same harbours as the *Queen Mary*—and this in our age of continual and rapid change. How much more so in the medieval age dominated by tradition!

Let us step into a Wellsian "time-machine" and fly across the centuries to take a glance at the shipping pursuing its hazardous course across the waters of the Mediterranean at the end of the fourteenth century. Over there we see a few tubby, clinker-built, little ships, caulked with pitch or flax or perhaps both, with square sails of animal skins tied to their single masts, sailing before the wind. They have edged their way down the French coast, braving the storms of the Bay of Biscay and the Tunisian pirates that seek to waylay ships off the Pillars of Hercules; and we wonder how they have survived in their open boats, how they have fed and watered themselves, and on what errand they go. A hardy breed, these men from the North, who work and sleep, drink and gamble, and are as much part of their ships as the ships are part of them.

Yonder we see a fleet of barges and ballingers from Spain covered by fighting ships fitted with castles, their iron and brass cannon reminding us we are now in the age of gunpowder. On what hostile expedition are they bent? Next we sight a group of Venetian galleys with naked rowers, mostly Arabs and Berbers four or five to an oar, all chained to their benches, pushing in time to the drum. Slaves all, getting neither pity nor mercy from their masters, driven by the taskmaster's whip, biting at their bits—those pear-shaped knobs of wood that muffled their cries—straining at their oars in the broiling sun or biting cold in a bondage from which only death could give them release. Off the Maltese coast we see a two-master with its leg-o'-mutton sails bellying in the breeze, clean-lined and carvel-built—a ship of the East, bound for the Levant. Maybe we shall meet a dromond, a great ship of three masts and lateen sails of the kind that made so mighty an impression on the Crusaders, who told in their pilgrim's tales how they rammed such a one off the Syrian coast.

If we look in at Genoa, or Pisa, or Venice, we shall hear the thousand clanking hammers of the shipwrights in the arsenal, for there is great business to be done in transporting troops and pilgrims. At the quays we find the carracks loading, and we stay and look closer at them. Here is one loading fruit, wine, and oil for Southampton. There is another embarking pilgrims for Jaffa, and yonder is one loading silk, another linen or wool, Eastern gems and spices for the hungry markets of Europe. Fine Mediterranean ships these carracks! It was this type of ship that took da Gama round the Cape and Columbus to America.

They were great builders in the Middle Ages, and whether they built cathedrals or ships they had an instinctive feel for the beauty of line. Considered æsthetically indeed all their craftsmanship, be it in stone, in wood, or on vellum, has a compelling loveliness. Whether you look at the flying buttresses of a Gothic cathedral or the fine curving sweep of the lines of their carracks of the fifteenth century you realize these builders were creating in harmony. They had little science. It was enough that they had a job to do; their hands could not go wrong. Though we know not their names, in this sense they were immortals.

Consider the ship. It is not rigged and fixed like a building. It rides on the curve of the sea and under the curve of the sky. It is a living thing, never at rest till it is dead—wrecked or in dry dock. Now, the one line that expresses finality, that leaves no more to be said, is a straight line. The Pyramids are constructed in straight lines—but they are tombs. The Parthenon is erected in straight lines, expressive of Greek fatalism, but the Gothic cathedral soars in the curves of noble arches full of aspiration, full of faith in a life to be, far better than the cruel world. So did the builders express their spiritual aspirations in their architecture.

The builders of ships belong to the same age, and are unconsciously influenced by the same *zeitgeist*, or time-spirit. Their ship is endowed with life—the sailor does not think of his ship as 'it' but as 'she' and 'her'—and the inevitable expression in terms of form is through the curve. After the first efforts, when the difficulties of craftsmanship have been mastered, the squat, tight lines are loosened, till in the carrack we get the flowing sweep from stem to stern that lends such grace. The verticals of the three masts support a curve, with the mainmast as radius. The sails billow with the wind in swelling curves. Even the decks cant upward, and as we tread them we feel their rise and fall. The hull bellies out from deck to keel, and both fore and aft the beak and stern curve to the sea.

The harmony of perfect relationship between the sea and the ship is not ultimately reached till we get to the clippers of the nineteenth century. In such ships as the *Ariel*, *Thermopylæ*, and the *Cutty Sark* we have the apotheosis of the shipbuilder's art. They could go no further. They were poems of construction and we shall not see their like again. The medieval builder never achieved anything like this, but he had felt the mystery and magic of it, and strove to catch its beauty. Of course we know that the fine streamlines originate in a functional necessity; the clipper was built for speed; and the sloping decks take off the sea-wash into the scuppers. Art includes "fitness for purpose" in its definitions, but there are sensibilities of proportion and quality of line too subtle for engineering. Efficiency is not the test, otherwise the butcher's chopper and the hangman's rope would be works of art.

The End of the Middle Ages

In the first half of the fifteenth century dismay, consternation, and despair spread throughout the Mediterranean lands at the march of the victorious Turk through the Holy Land, and Christian exiles, fleeing in terror, told of the appalling cruelties of the barbarous infidel invaders. The very name Turk passed into the currency of European tongues as a symbol of terrorism. Into the great Christian cathedral of Saint Sophia, in Constantinople, the stricken people fled for sanctuary, and from its vast spaces hoarse voices cried, "*Dies iræ! Dies iræ!*"—"The Day of Judgment" is at hand. The fall of Constantinople in 1453 seemed to portend another desperate and disastrous conflict with a horde of Asiatic invaders, and the prospect filled the hearts of the people with fear and foreboding. The great highways of communication between Europe and the Orient were now blocked, and the lucrative trade of the Italian maritime republics came to an end. The carracks rocked idly at their moorings, and the great shipyards of Genoa and Venice were silent.

Contemporary Europeans, blind and deaf to the great movements and currents shaping their destiny and history, thought the end of their world had come with the capture of Constantinople. They could not read the sign-posts pointing to new horizons. Had not the Venetian, Marco Polo, stirred their imaginations a century ago with his strange and wonderful tales of far Cathay? The profound effect of this awakening to the existence of rich lands, opening up magic casements on perilous seas, was not lost. The question of finding new routes to the East began to be considered by practical minds. Could they not see the new significance of the fall of Ceuta to the Portuguese in 1415, of the Norman, Catalonian, and Genoese adventurers crossing what Kipling called the "swinging mounds of the Western swell" as far as the Canary Isles, Madeira, and the Azores, and of the new restlessness that now possessed men's minds?

For the Middle Ages, with its passive acceptances, was coming to the end. You cannot isolate the exploits of Vasco da Gama, Columbus, and Magellan from the break up of the old traditional order or separate the adventure of Fernando Cortez from the fiery independence of Martin Luther. The Old World was passing. Venice was in decay. The Hanseatic League lost its power. A new world was discovered, and a new world was born. It was the birth of modern man, self-conscious and assertive. Within a hundred years of the fall of Constantinople, instead of Europe fighting a desperately defensive war against alien aggressors, the outside world was engaged in a hopeless struggle against the European invaders.

The Portuguese, the Spaniards, the English, the Dutch, the French, were to go ranging over Africa, Asia, and the New World in a conquest through the successive centuries that was to Europeanize the earth.

It was an amazing phenomenon. In classic times we have a history of migration and territorial expansion, but nothing like this world colonization and conquest which began in the fifteenth century. The traders followed in the wake of the merchant adventurers, the colonists followed the traders, and European conceptions of economics and politics and European standards of civilization and culture spread from this small continent to the far ends of the earth. The fall of Constantinople marks the beginning of the modern world, the European world, and the pioneers are the great navigators who "go down to the sea in ships, that do business in great waters; These see the works of the Lord, and his wonders in the deep."

> Aboard! Aboard! since fates do bid aboard,
> And slice the sea with sable-colour'd ships,
> On whom the nimble winds may all day wait,
> And follow them as footmen through the deep.
>
> CHRISTOPHER MARLOWE

CHAPTER III

THE EARLY NAVIGATORS

(1400 TO 1600)

Influence of the Flat Earth Theory—Henry the Navigator—Magellan—The demand for Spices—Hardships of the Early Explorers—Columbus—The Westward Course—Cabot, Cartier, Hudson—The Spanish Conquests and their Effects—English Privateers—Defeat of the Armada—Drake—Elizabethan Ships—The Rise of a New Literature of the Sea—Progress of Shipbuilding in Tudor Times—Founding of the East India Company.

> Necessity urges desperate measures.
>
> CERVANTES, *Don Quixote*

The Influence of the Flat Earth Theory

THE barbarous Turk held the gate to the East, and the Christian cathedral of San Sophia was now a Mohammedan mosque. The steady advance of the Ottoman up through Syria had garroted slowly the trade-routes, choking the life out of the prosperous trade with Palestine that had made the merchants of Europe rich. In 1356 the Ottoman Turks crossed the Dardanelles, and in 1453 they captured Constantinople and destroyed the Byzantine Empire. Meanwhile the break-up of the power of Tamerlane had made "the golden road to Samarkand" almost impassable. Trade now could only flow freely through Alexandria and the Red Sea; Venice, who had secured privileges from the governing Mamelukes, a Mohammedan tribe, monopolized it, with the result that Eastern produce entering Europe by this route was both scarce and almost prohibitively expensive. In 1517 the Turks conquered Egypt, and the last of the old trade-routes was blocked; for though the Turks were ready to conclude agreements with Christian Powers, their terms and conditions hampered and obstructed to such effect that the whole Eastern Mediterranean was practically closed to Europe's merchants. The Mediterranean was now a *cul-de-sac.*

The opulent riches of the Indies, the fabled wealth of far Cathay, of which Marco Polo had written such fantastic and wondrous tales, mocked like Tantalus, for they could not be reached. Through the narrow straits between the Pillars of Hercules ships could sail—but whither? True, the ancient Phœnicians reached Britain, but they clung like leeches to the coast, and it was still the way of sailing. The Western Ocean was all uncharted; the saga of Leif Ericsson's daring was not sung in Mediterranean lands, and his discovery only lingered as a vague rumour. Yet it haunted the mind in the fifteenth century, for it was believed that somewhere in this vast waste of waters there was a lost island, the Antilla. But that ocean flinging its breakers against the western seaboard was peopled with nameless terrors.

The Church preached, and men believed, that the earth was flat; he who dared to doubt did so at his peril. Peter of Abano in 1316, and Cecco d'Ascolo in 1327, were burned alive for their heretical views on the subject. Ptolemy, the Alexandrine scientist of the second century, had established the conception, and the theologians concurred, that the earth—man's dwelling-place—was the centre of the universe, and the sun, moon, and stars were only candles to light it. This system practically controlled all thought till well on in the sixteenth century. Francis Bacon believed it.

Since the earth was flat, and there were no Antipodes, the great waters which surrounded it ran to the edge of the world. Some said that unholy monsters waited to devour the trespasser; others said there were boiling seas from the cauldron of hell. Nor were these fears confined to the ignorant. The merchant princes of Italy, for all their scepticism, accepted the flat earth theory, and Columbus appealed to Genoa in vain.

Portugal and Spain, at the entrance to the Mediterranean, faced the open Atlantic. Suppose this were the way to the East? The question must have put itself, for whoever found that way would earn glittering prizes. By their situation these countries were geographically right. The economic factor of profit and the social factor of need were both pressing realities. But it is not a law of nature because the factors are present that the expected will happen. It depends on the way men think. There is nothing more difficult than throwing off ideas inculcated since childhood; and religious ideas which have behind them all the authority of the Church are the most tenacious. Even for a man of strong and independent intellect it may take years before the precociously dulled feelings become fresh again, before the shackles of routine fall off, before he can free himself to think for himself. This is true to-day. How much more so in an age of Faith and Obedience, and especially in Spain and Portugal, both fervent in their loyalty to the Pope!

Henry the Navigator

It is an old tag that the hour brings forth the man. In Portugal there was an enlightened prince who realized that the great ocean was for ships and who recognized the signs. Henry the Navigator, though he never took a long voyage, was a pioneer. His scientific interest in seamanship led him to collect all available data, to gather round him the mariners who could give information. He established at Sagres a university for the study of geography, astronomy, and navigation. He did for the navigator what Cosimo de' Medici, in Florence, did for art and letters. The arts of map-making and map-reading were studied in the school of cartography. The exodus from Constantinople which stimulated the revival of learning furthered his plans. According to Portuguese chroniclers, he invited Arabian and Jewish mathematicians to serve as tutors, and to collaborate in the making of instruments and charts. He had won his spurs at the siege of Ceuta in 1412. Was it then that his ambitions were fired?

Mercenary, perhaps, for there were great stakes to be won, yet he was already enormously wealthy; ambitious, perhaps, for by winning the secret of the seas Portugal would become the greatest Power in Europe; a dreamer, perhaps, with a vision of new worlds for old, yet he was intelligent, eager, original, and strongly independent. He challenged the greatest geographical authorities of his time; he defied the superstitions of his age; he questioned the Ptolemaic theory, and with practical genius set to work to found a science of navigation. This Catholic prince deserved his title "Navigator."

That he did not live to see any of his dreams fulfilled is one of life's ironies. But he created more than a university—he created disciples. It was men bred in the new freedom who brought wealth and power to Portugal and made Lisbon the chief port in Europe. For during the reign of King Emanuel the Great a Portuguese navigator, Bartholomew Diaz, rounded the Cape, the sails of his little ships blown to rags, and he named it the "Cape of Storms." It was a tremendous feat to skirt the whole length of the African coast. Only mutiny forced him to return, leaving to another Portuguese mariner, Vasco da Gama, the honour of crossing in 1498 the Indian Ocean and reaching Calicut.

Ferdinand Magellan

Though he sailed under the Spanish flag, it was a Portuguese navigator, Magellan, who in 1519 embarked on that epic venture, the circumnavigation of the globe. This was, indeed, a new voyage of the Argonauts. When his five ships left the port of Palos on that August morning the largest of the five, the *San Antonio*, only 120 tons burden, it was on a journey that would be recorded in the annals of adventure as one of the greatest achieved by man. But not the most momentous, that distinction belongs to the voyage of Columbus. Before Columbus sailed due west all navigation turned to the east, though the mariners had first to go south to round the cape which da Gama had renamed because of its promise, the "Cape of Good Hope." Columbus was "the first that ever burst into that silent sea"—the first to set his face to the West that he might see the East. Without the voyage of Columbus would there have been the voyage of Magellan? These were the great inheritors of Prince Henry the Navigator, who first secured Papal dispensations permitting such heretical voyages. Without this sanction how could their ships be manned?

Spain and Portugal, rivals in commerce, were the favoured children of the Holy Church, but their brotherly relationships were seriously disturbed by the discovery of Columbus in 1492. Portugal, who claimed the Atlantic Coast of Africa, saw her position in the East menaced, and a quarrel developed over their respective rights. By a masterstroke Pope Alexander VI settled the dispute by drawing an imaginary line—Columbus's line of no magnetic variation—down the middle of the Atlantic, granting all land east of it to Portugal and west of it to Spain. It was, therefore, in the immediate interests of Portugal to explore eastward, and the direct result of this was da Gama's expedition.

The Demand for Spices

Behind all these ventures was a commercial motive—the rich profits of trade with the East. More than for gold, ivory, and gems the demand was for spices. Europe was hungry for spices. There is an old rhyme which runs:

Pepper and spice
And all things nice.

The use of spice was demanded by the foulness of the meat before it reached the tables of even the richest. In the Middle Ages a peck of pepper was worth more than a man's life.

We have known something in these war years of the monotony of an unvaried diet, and appreciate as we never did before the gratifications of flavourings and appetizing sauces. But what of the Middle Ages? They had no tea, sugar, coffee, or cocoa, no potatoes or tomatoes, no oranges and lemons, or the wide range of fruits that we enjoy in normal times, no fruit juices and 'soft' drinks, no canned, frozen, or dehydrated foods as we know them. The drying process was of course used—fish dried in the sun, like the sun-dried, salted haddocks, or 'spelding,' that can still be bought in remote Scottish fishing villages—and the practice is as old as the Norsemen. It was all salting and pickling. They had few root-crops and could not feed for killing in the winter. Pickled pork, salted meat, and fish were their staple diet. It was the luxury of fresh venison or hare that explains the fierce game-laws against poachers.

Spices whet the appetite; spices make the dish, and spices came out of the East. Pepper and ginger, cinnamon and nutmeg, aloes and saffron—these were the demand. A peppercorn rent, which to us is a mere acknowledgment, was in those days a substantial figure. A wealthy man was called a "pepper sack." Chaucer's Frankeleyn liked "his sauce . . . poynant and sharp." On the nobleman's table was the great salt-cellar, and a jewelled model of a ship, the *nef*, which held the spices. The ancient Phœnicians scoured the known world for copper and tin. The medieval explorers sailing east went in search of pepper.

For us who used to go on cruises in 20,000-ton luxury liners, spending our days lolling on deck in our *chaises-longues*, drawn up like super *fauteuils* before a watery stage, sheltered behind plate-glass screens on a covered promenade with throngs of liveried servants dancing attendance with trays, rugs, and periodicals; or who wandered out of sheer ennui through the panelled and heavily decorated halls of time: fake Tudor, fake Chippendale, fake Louis Quinze; or who sipped cocktails and tasted ices or feasted at overloaded tables from outsize menus; or who danced in the evening in gilded ball-rooms with neon lighting to dance-band rhythms; or who found opportunity to play Romeo and Juliet beneath the stars—for us it is almost impossible to realize the hardships, anxieties, and perils that these early navigators had to face.

Their ships were small for ocean-going vessels, often leaky, and all of them comfortless, pitching and rolling even on a quiet sea. They sailed uncharted waters into the unknown, and there, "all, all alone, alone on a wide wide sea," they buffeted with storms or were becalmed in a deadly silence. Their crews were desperadoes, brutal, ignorant, and superstitious, drawn from the seaport slums. The food was often weevilled biscuit and rancid salt pork. The water was tepid and brackish, except for that caught in a rainfall. There was little or no shelter from wind or sun, and bare boards in cooped-up forecastles were the only beds. The men were locked together in the same little ships for weeks and months, till they hated the sight of each other.

Sometimes in dirty weather there was little time to rest day or night. Sometimes when the wind was set fair there was nothing to do, and then the devil's broth of murder and mutiny was brewed. Enforced celibacy created fractiousness and sullenness. No friendly light was seen of a passing ship in the darkness, no warning light from the cliffs—nothing but the bare waste of waters day in and day out. Crews knew not whither they went nor where they were, and superstitious fears translated every unusual sight into a phantom of horror. If they were wrecked or the ship capsized, they knew there was no hope and that none would know their fate.

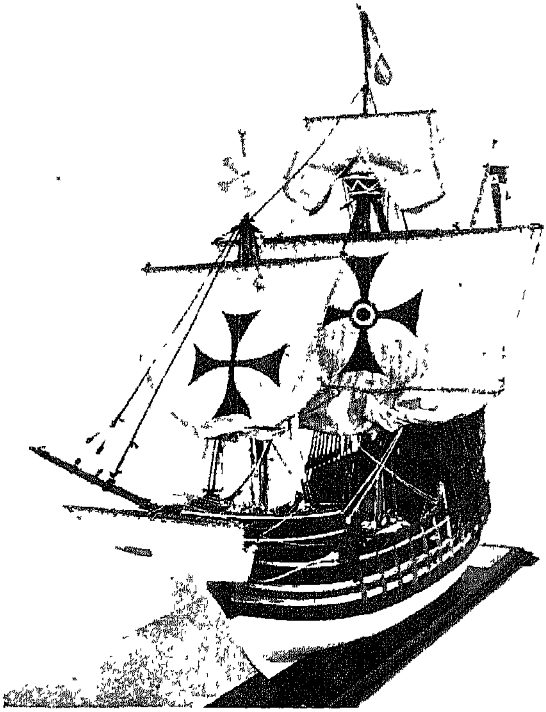
The navigator himself was loneliest of all. His was a terrible isolation, for his purpose and will none could understand. Those who had financed his expedition cared only for its plunder, and if he failed to give rich profits he could expect short shrift. The gaping crowds who saw him set sail out from harbour regarded him at best as a madman and at worst as a heretic. His crew looked on him with mingled fear and suspicion, and the longer the journey the greater the danger of open mutiny. He could only hold them together by cunning and cajolery or through terrorism. His officers, lacking his faith and sharing the common fears of the unknown, could rarely be relied upon in a crisis and were often disloyal. Think of the shaking doubts when plans miscarried, when calculations went wrong, when hopes were frustrated, and when, like those of his men, paralysing fears gripped his heart, and he had none in whom he could confide. Think of his primitive instruments—no reliable maps or charts, no sextant or chronometer, no gyroscopic compass. He had nothing but the faith in himself and his purpose, and the courage not to depart therefrom whatever the difficulties, disappointments, or dangers.

The man of genius always walks alone, but it is his privilege to carry knowledge one further step. He has the power and the courage to stand alone, but his boldness and ability is the means of expressing the secret desires and half-formed thoughts of other men. That is why, when the navigator at long length touches land, he is acclaimed and glorified by the crew that plotted his death. For his deed is theirs to share. In that moment they see in their leader something in themselves they never knew. When Columbus touched land across the Atlantic his cut-throat crew knelt at his feet. The Odyssey of these early navigators the world will not willingly let die, for in their story is more than material gain. It is a spiritual achievement.

Christopher Columbus

Of the world's greatest men we know the least, and Columbus is no exception. His ancestry and his boyhood are lost in the mists of obscurity. Some Italians assert with confidence that he was a Genoese, born in the ancient city of Genoa sometime between August 25 and the end of October 1451, the son and grandson of woollen weavers. Some Spaniards think of him as a Spaniard, while Sir John Squire, after reading Don Salvador de Madariaga's erudite biography, concludes that Columbus was "a pure-bred Jew from a Jewish family, exiled from Spain, in Italy."

Be that as it may, he had much experience of the hazards of the sea, and was a man of high intelligence. He had studied the works of the geographers, read closely the accounts of the travels of Marco Polo and annotated the text with his observations, and the tale of the Norsemen's discovery in the Dark Ages of land over the Western Ocean haunted his mind. He conceived the idea of finding a passage to Cathay, which we now call China, by way of the West. He hawked his idea round Europe and was generally dismissed as a madman. Such a fantastic proposal was as revolutionary in those days as Einstein's theory of a finite universe where parallel lines meet is to us. Besides there were strongly entrenched vested interests definitely opposed to such a development. When he sought the patronage of the King of Portugal, in whose employ he had served as a navigator on the African service, he was refused. Any route that did not lie eastward would menace Portugal's supremacy on the ocean routes. Then he tried his native city of Genoa and was again refused. Any way to the East which did not pass through the Mediterranean would spell financial ruin to the Genoese merchants.



Columbus's "Santa Maria" (1492)

From a model in the Science Museum, South Kensington. Crown copyright

Columbus made applications to England, France, and Spain for financial assistance to equip an expedition to cross the Atlantic and reach Cathay by a westward course. There were fine seamen in England, for he had met them when he visited Bristol in 1474, and the English King was alive to the benefits of trade. Spain was the great rival of Portugal, and out of self-interest and jealousy she might be persuaded to listen sympathetically. France was on the seaboard of the Western Ocean, and thus well placed to profit by such a discovery. But communications were slow, and slower still was the breakdown of prejudice against such a venture which defied all the teachings of the Church and all the science of the Ptolemaic geographies.

Henry VII of England sent for Columbus in 1489, but he was just too late, for largely through the intermediary of the prior Juan Perez de Marchena, whose friendship Columbus had gained while staying at the little monastery of Rabida, *en route* to France, the Genoese navigator's proposal was presented to Queen Isabella of Spain. That Isabella eventually persuaded her husband Ferdinand to support the scheme is not only a tribute to her independence of mind but a notable illustration of a new type of womanhood. The Age of Chivalry placed the wife in subordination to her husband, and romanticized the relationship in an exalted idea of love which may have inspired the troubadours, but, at the same time, reduced her into an intellectual nonentity. This ideal of the ethereal maiden and the submissive wife had broken down under the Renaissance influence both in Italy and Spain. Titian immortalized the developed woman in his canvases, and Spanish literature from Cervantes to the Quinteros reflects a type of woman who stands on the same ground as man and is his equal, and often his superior. Columbus was already arranging a contract with Spain when the invitation from England reached him. In 1492 King Ferdinand and Queen Isabella created him Admiral and Viceroy of Castile.

The story which opens on August 3, 1492, when Columbus, admiral of a fleet of three small vessels and one hundred and twenty sailors, sailed out of the harbour of Palos, in Andalusia, on a voyage westward to reach Cathay, makes world history. The Greeks have a word *eironeia*—irony—which we apply to the fate which cheats. Just as Prince Henry the Navigator never lived to see a new discovery, just as Magellan, twenty-seven years later, never lived to see the accomplishment of his voyage round the world, for he was killed in the Philippines fighting with his men as mercenaries for the particularly blackguardly King of Cebu, so Columbus, though he made four voyages, never knew that he had discovered a continent—a new world. Strictly speaking, Columbus did not discover America. This great navigator believed that Cathay lay just beyond the islands where he planted the Spanish flag, and died in that conviction.

The three ships, *Santa Maria*, *Niña*, and *Pinta*, are almost as legendary as their admiral. Nobody knows what they really looked like, says Professor Morison in a frank statement, "We have no contemporary painting or drawing of a single ship in which Columbus sailed." But they have been reconstructed from such facts as can be gleaned from records—for Columbus had no faithful Boswell like Magellan's Pigafetta—and illuminated by abundant data on contemporary vessels. The elaborate set of plans of the *Santa Maria* 'discovered' in Caraccas dockyard in time to build a replica for the World's Fair of 1893 was undoubtedly faked. *Niña* is recorded as having been about 60 tons, meaning wine-tuns; she was a single-decker, originally rigged as a three-masted lateener but afterwards altered to square-rig. *Pinta* was a square-rigged caravel of Palos, and proved herself a smart sailor. She was about 70 tons.

The flagship, the *Santa Maria*, probably resembled a Genoese or Venetian carrack, a vessel of 100 tons burthen. She was slower than the other two, and Columbus never liked her. She carried three sails, a square mainsail, a topsail of much smaller size, and a lateen mizzen. In 1893 a replica of the *Santa Maria*, built as nearly as possible with the data available to the exact dimensions of the original ship, was used to cross the Atlantic on the course followed by Columbus. The time occupied was thirty-six days, and the maximum speed about 6½ knots, whereas a fast modern liner makes 30 knots, or nearly 35 miles per hour. Columbus kept up an average of 4 knots, and the *Santa Maria* did 100 miles in the first day's run. It has been estimated that in favourable conditions the Viking ships could attain 10½ or 11 knots.

When we think of the ships and the crews that Columbus took to sea the wonder is not that it took him sixty-nine days to cross the Atlantic but that it was done at all. He landed on an island inhabited by copper-coloured natives, who called it Ojuahamani, and, setting on the sand his famous banner of the Green Cross, he christened the new land San Salvador, now Watling Island, one of the Bahamas, and took possession in the name of Ferdinand and Isabella of Spain on October 15 1492.

> The whole history of the Americas stems from the four voyages of Columbus [writes Morison], and as the Greek city states looked back to the deathless gods as their founders, so, to-day, a score of independent nations and dominions unite in homage to Christopher Columbus.

Columbus was not satisfied with his first discovery for from San Salvador he sailed from island to island, each one, he stated, more beautiful than the last until he reached the great island of Cuba. This, he said, seemed to be like heaven itself. He and his men were enchanted with the bright colours, the wealth of tropical vegetation, and the beautiful bays and rivers. Failing to find gold or treasure he sailed on to the other islands, but on reaching Hispaniola his flagship was wrecked, and so, leaving behind forty-two of his men, he sailed to Spain for relief.

When he reached Spain Columbus was the hero of the hour. The grey-haired explorer set at the feet of his sovereign the trophies of his great voyage; spices, nuggets of gold, strange animals, lizards, and birds of rare plumage.

The next year with a fleet of seventeen vessels Columbus recrossed the Atlantic and discovered Dominica, Guadaloupe, Montserrat, Antigua, Puerto Rico, and several smaller islands. Most of these were inhabited by a race of cannibals called Caribs, from whom comes the name Caribbean Sea. Leaving his brother in charge on the island of Hispaniola, now called Haiti—the Black Republic—he sailed westward again to try to reach Cathay but discovered Jamaica instead.

Worn out and ill by his voyagings, he was taken to the island of Hispaniola, his men believed to die, but he recovered only to find that during his long absence this earthly paradise had become a veritable hell with men's vilest passions let loose among the natives.

He returned again to Spain, and two years later set off on his third voyage. This time he discovered Trinidad and also the coast of the mainland, but he did not realize that it was the vast continent of South America. He next discovered the islands of Tobago and Grenada, but in visiting the other islands he found everything in hopeless confusion. In fact, though supremely great as a navigator he was an utter failure as a colonizer.

In May 1502 he set out on his fourth and last voyage, and, going still farther west, he landed upon what is now British Honduras, and, following the coast-line, he discovered Nicaragua and Panama. Eventually, after battling with adversities, his ships were beached in a storm on the shores of Jamaica, and it was impossible for him to put to sea again. After a year or more living under miserable conditions, persecuted by envious enemies he was carried back to Spain, a worn out, broken man though only fifty-six years of age.

There was little recognition and less gratitude for him. Indeed, none of these pioneers was recognized by his contemporaries. Have we not always stoned our prophets? Columbus, manacled in chains, was brought back to Seville to die in poverty and disgrace. Balboa, who, "silent on a peak in Darien," was the first to sight the Pacific, was executed. Magellan was killed along with some of his own crew. Raleigh, who founded Virginia and wrote a *History of the World*, was led to the block on Tower Hill. Hudson, who discovered the Hudson River, was marooned and lost in the great bay that bears his name. Their crews, those that survived, were left to beg, steal, or starve in the gutter. But their patrons, their financial backers, the corrupt, licentious nobility, feasted and gambled in their palaces, adorned their mistresses with the perfumes and jewels of plunder, filled their coffers with the golden ducats, and never gave a thought for the captains and their men who had dared so much for so little.

An international tribute is now planned in the form of a great Memorial to Christopher Columbus, which is to be built on the island territory of the Dominican Republic near the first permanent settlement of the European in the New World. The winning design in an open competition, in which 450 architects from forty-eight countries submitted drawings, is by Joseph Lea Gleave, now head of the Architectural School in the Edinburgh School of Art. The scale model exhibited in March 1946 at the Royal Institute of British Architects, London, shows an immense structure, cruciform in plan, a mile in length, and massive in its masonry, set in a great park which will occupy a site of 2000 acres between the Ozama river and the Caribbean Sea. Impressive in its severity of style, dignified in proportion, homogeneous in conception, it will be an imposing example of twentieth-century monumental architecture. In its central chapel, as in an Egyptian sarcophagus, the honoured bones of Columbus will be enshrined. Above, shining its beams from a revolving beacon over the waters of the ocean which he crossed, the light on the tower will be a symbol of the illumination of his discovery in a world darkened by ignorance and superstition. At long last the twentieth century will pay fitting homage to the great navigator who changed his world.

The history of the Conquistadores is a mingled yarn of courage and cruelty, ruthlessness and rapacity, and if you would learn of stout Cortez and his conquest of Mexico, of Pizarro's treacherous murder of Atahualpa, the noble, proud prince of the Incas, of the march to Honduras, of the silver mines at Potosi, and the decimation of native labour so heartless that a Dominican friar out of pity suggested the employment of African Negroes, thus opening the abominable slave-trading business—if you would learn what imperialism at its worst can be, then read Prescott's *Conquest of Mexico* or, better still, Bernal Diaz on *The True Story of the Conquest of Mexico*.[1] This bluff, sturdy old soldier writes with guileless charm and is palpably honest. Suffice it to say that the Spanish argosies, loaded with the spoils of the Incas, the silver ingots from Mexico, the treasures rifled from "New Spain," sailed in regular passages back to Europe, and for nearly a century they went to and fro unchallenged. Portugal, who also had bid for a world empire, lost her gambit, and Spain, rich and powerful, ruled the seas. Vespucci, de Soto, Magellan carried forward the flag of Spain in the wake of Columbus, westward, ever westward, till it girdled the earth.

How did the continent which Columbus reached get its name? Was it, as is generally supposed, named after Amerigo Vespucci, one of the lieutenants of Columbus on his last voyage and who then conducted explorations of the mainland? Was it named by Cabot after Richard Ameryk, Sheriff of Bristol, through whom he received his pension from Henry VII? The westernmost part of France—that is, Brittany—was anciently known as "Amorica," and it is still to-day in poetry and letters "Amorique." If it is true the original meaning of the word had something to do with "farthest west" there appears to be a clue to the mystery. Have you not eaten *homard à l'Americaine*, which is a corruption of *à l'Amoricaine*—that is, in the Brittany manner. This theory appears both natural and credible, but no final assertion of the derivation of the name America for the western continent is now possible.

Spain's Lead in Shipbuilding and Navigation

As Spain was now the first maritime Power in Europe, so she stood first in the arts of navigation and shipbuilding. Her navigators, crossing the Atlantic, learned to follow the north equatorial current when outward bound, and to sail in the Gulf Stream when homeward bound, making the passage in a month. They observed the wind-drifts and charted them, jealously guarding their navigational secrets. Their shipwrights built galleons and carracks of a thousand tons or more, leaded their keels, and used copper nails and iron chains. Spain took the lead in cartography, and Mercator's projection dates from 1537. Mercator was a Belgian whose real name was Kremer (a small merchant). He was cartographer to Charles V of Spain. Columbus had been the first to observe the variation of the magnetic needle. Vasco da Gama noted that magnetic variation at the Cape of Good Hope was nil, hence he called the most prominent point Cape Agulhas—*agulha* being the Portuguese for needle. Hakluyt, the first important English writer on nautical matters, who was born about the middle of the sixteenth century, refers to Spain's establishing, in the reign of Charles V, a Pilot Major for examining "such as sought to take charge of ships" in order to secure a standard of efficiency in navigation.

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[1] Harrap, 1928.

By a system of bounties, encouragement was given to good workmanship and initiative in shipwrighting. The navy yards of Spain were under one central authority, and all efforts to improve both shipbuilding and navigation were unified under a single direction. It took nearly a century for the smaller Northern Powers—the English, French, and Dutch—to equal the Spanish achievements. When Henry VIII began to enlarge his navy he enlisted Spanish craftsmen into his shipyards, and employed Spanish sailors because they were familiar with the handling and rigging of big ships.

John Cabot

Now Portugal and Spain blocked the way to the East. Now all the produce of East and West came to the Iberian peninsula. When the news was spread that Columbus had reached the Indies by sailing westward the imagination of all mariners was fired. John Cabot sought the patronage of Henry VII, and in May 1497 this Genoese captain and his son Sebastian with a crew of eighteen, in the ship, *Mathew*, sailed from Bristol. He reached Nova Scotia by landing on Cape Breton Island, but believed he had discovered Asia. Again he tried, and skirted the North American coast, as far south as Maryland. But where were the lands of gold, frankincense, and myrrh?

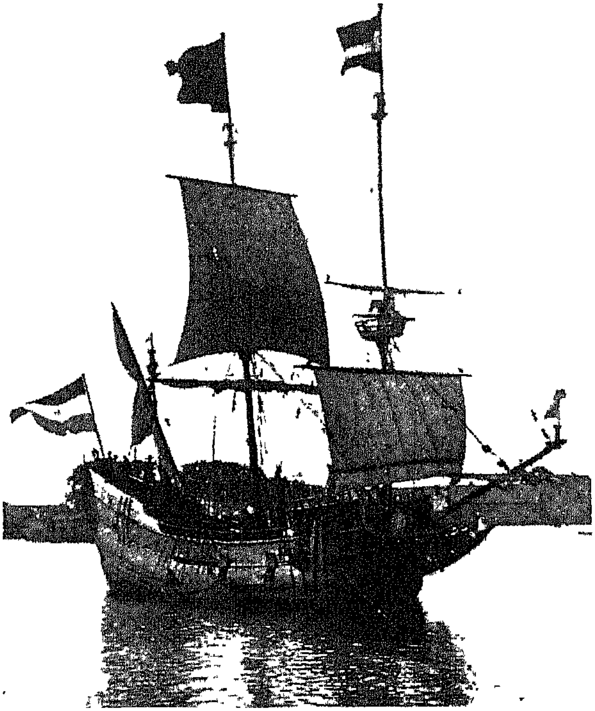
Jacques Cartier

Next came Jacques Cartier in 1534, carrying the French flag and sailing westward in the *Grande Ermine*, determined to find the fabled Cipango of which Marco Polo had told his wondrous tales. It was not China or the Indies that he reached, however, but the bleak and inhospitable shores of Newfoundland, and, sailing up the St Lawrence, he heard the natives speak of their Kamatha. So he named this land Canada.

Always, always disappointment! The desire "to see and knowe the farre countreyes of the worlde" was not all. Where was the land of Ophir? Where was the fabulous wealth of the East? The navigators began to realize that a mighty continent blocked the way. Magellan, turning south, rounded Cape Horn; Hudson turned still farther north, but never returned. Four voyages he made in his Dutch ship, the *Half-moon*, and finally he reached the great ice-barrier off Spitzbergen; but in 1611, on his last desperate attempt to find a North-west Passage to China, he was cast off by his mutinous crew to drown in the dark and icy waters of Hudson Bay.

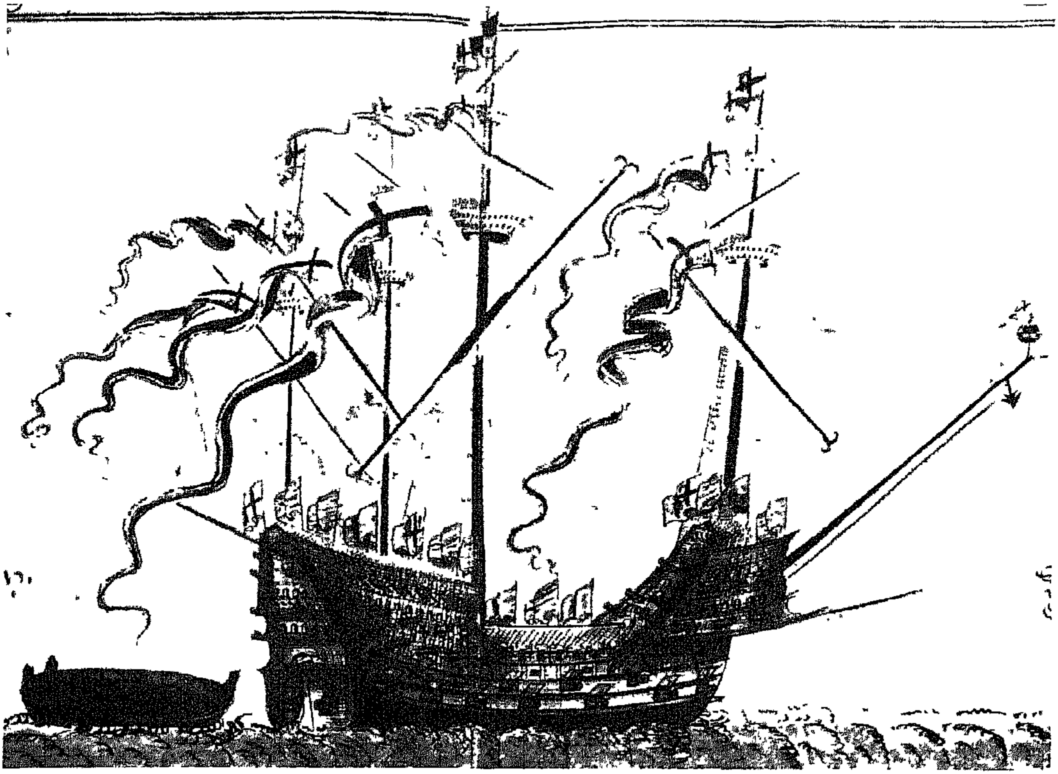
Henry Hudson

Henry Hudson was a citizen of London and probably a relative of Christopher Hudson, one of the founders of the Muscovy Company, whose ship, the *Hopewell*, he had commanded in two attempts to win the North-west Passage. Unsuccessful but not undaunted, he had reached the great ice-barrier between Spitzbergen and Nova Zembla in 1608, thus sailing farthest north. His bold seamanship and intrepid explorations so impressed the Dutch East India Company, anxious to find a western route to their newly acquired Far Eastern possessions wrested from Spain and Portugal, that they engaged this English navigator and put him in command of a newly equipped ship, the *Halve Maene* ('Half-moon'). She was a small vessel of only 80 tons burden, measuring 74·54 feet over all, 57·80 feet on the water-line, 16·95 feet in beam and 10·08 feet in depth—hardly bigger than a yacht. She had the usual high stern and carried three masts. On the foremast was a square sail and topsail, on the mainmast a mainsail and topsail, and on the mizzen a lateen-rigged sail. A replica of this historic ship was made in 1908 by the shipyard of the Royal Netherlands Navy at Den Helder, Holland, and shipped in the following year to New York on board the s.s. *Sommelsdijk.*



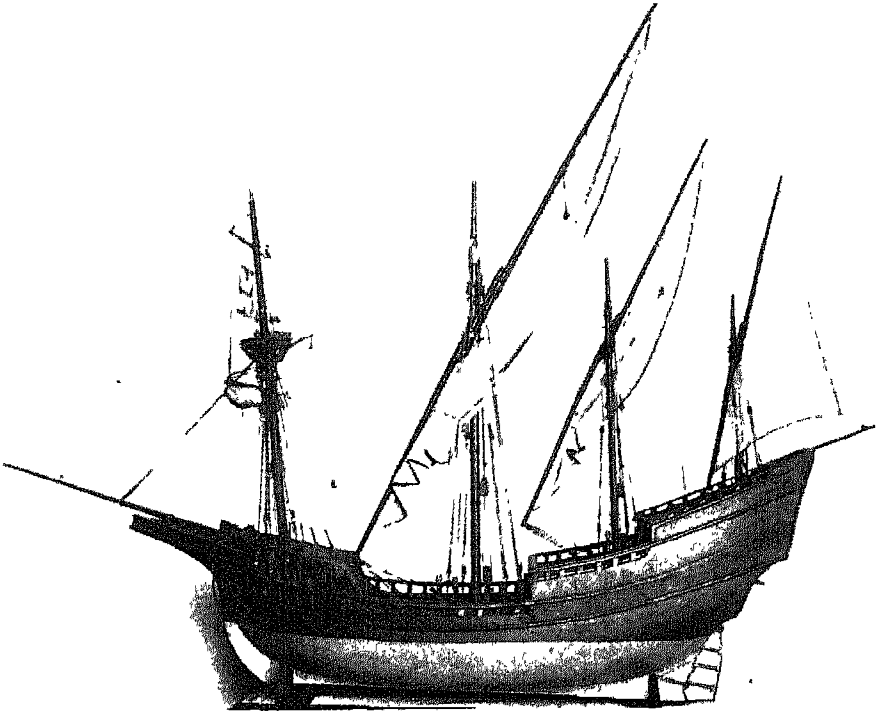
A Full-size Replica of the Dutch "Half-moon" ("Halve Maene")

Manned by eighteen Dutch and English sailors, the *Half-moon* set out on Hudson's third attempt to reach the East by sailing west, but though again defeated by the Arctic ice and forced to turn south, skirting the eastern seaboard in a vain attempt to find a strait, this voyage was to prove the most famous, for on September 24, 1609, the *Half-moon* dropped anchor inside of Sandy Hook in the Lower New York Bay, and exploring parties discovered "a good entrance between the two narrows," which at the time he believed to be the entrance to a strait. Ten days later, to quote the words of Mate Jouet, they sailed "into as fine a river as can be found." Though it is recorded that a Florentine navigator, Giovanni Verrazano, in the pay of France had sighted this river as early as 1524, and a year later a Spaniard, Estevan Gomez, noted it, this geographical knowledge, owing to the secrecies of national rivalry, had passed out of memory, and the rediscovery by Henry Hudson was the first real survey. Little did he realize, as he mapped and reported on the river that now bears his name, the fertile valley, and the islands at its mouth, that this scene, "as pleasant a land as one need tread upon," posterity would make the seat of the Western hemisphere. Little did he realize, as the *Half-moon* sailed up the sheltered waters surrounded by the rich green of the fertile valley, the tree-clad heights in all their autumn glory, and the blue line of the Catskill Mountains in the distance, that he was writing such an auspicious event in history that would honour his name and that of his little ship on the scrolls of time.



THE "HARRY GRÂCE À DIEU," 1546
This illustration is reproduced from Anthony Anthony's *Roll of the Navy*
By courtesy of the Librarian, Pepysian Library, Cambridge

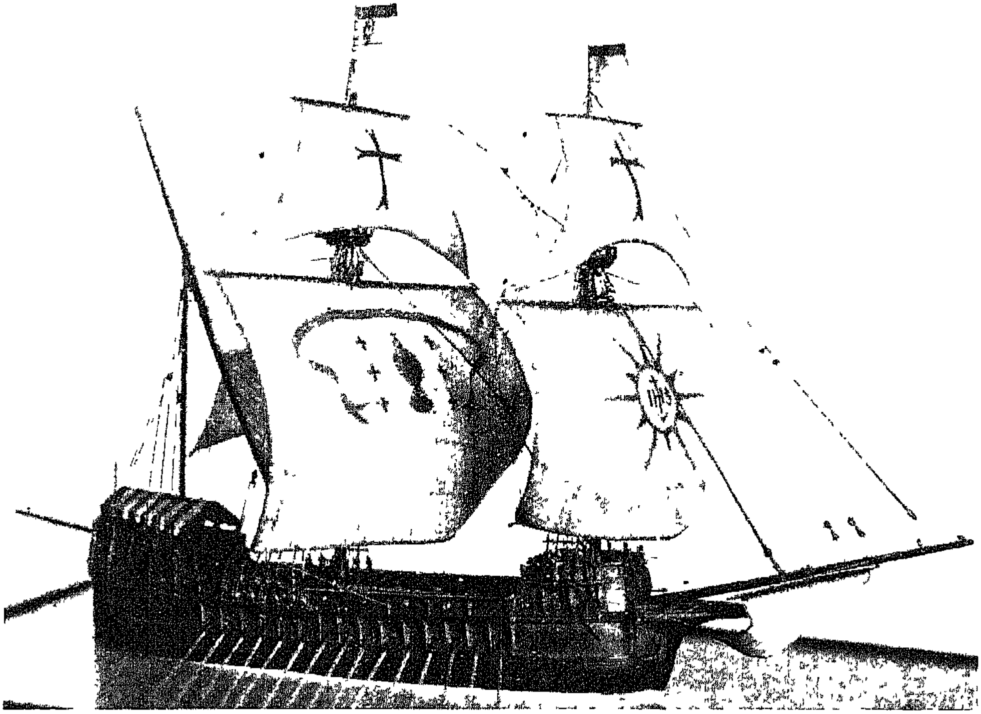
England under the Tudors was now enjoying her own Renaissance. When Henry VIII built the *Harry Grâce à Dieu*, familiarly known as the "Great Harry"—a four-master of over 1000 tons—and fitted her with 126 brass cannon, he laid the foundations of a Royal Navy as distinct from the mercantile marine. By building dockyards at Portsmouth, Woolwich, Erith, and Deptford, he prepared the way for the challenge to Spain. Throughout this country there was a deep-rooted hatred of Spain, a hate born of jealousy and intensified by religious fanaticism. That Spain was a great Catholic state condemned her in the eyes of all true Protestants. Spain's vast possessions, her immense wealth, her domination of the seas created enmity. Every galley Spain could send to the Spanish Main came back loaded to the hatches with gold and silver. The dreams of the golden road to Samarkand and far Cathay that possessed the minds of the merchants of the Middle Ages faded away before the reality of this Eldorado. The treasures of Montezuma and the gold mines of the Incas filled all covetous eyes.



A MODEL OF A PORTUGUESE CARAVEL (CIRCA 1530)

No longer did the old Mediterranean trade-routes carry the wealth of the world. Venice and Genoa had had their day. The West now beckoned, and those lands with ports on the Atlantic seaboard had the future in fee: Spain, Portugal, France, England, and the Netherlands. New rivalries were roused. Spain was not left in unchallenged possession. England so strategically placed on the new trade-routes was not slow to see her advantage. And Spain too, by her dog-in-the-manger attitude that no foreigner, particularly no heretic, should be allowed to trespass in her territories, all too big for her, aggravated the ill-will. A conflict was inevitable. Even to-day an echo of the Englishman's contempt is to be found in the word 'dago.' It was the perennial conflict of the 'haves' and the 'have-nots.' The desire to plunder the Spanish treasuries, to waylay the Spanish galleons laden with their silver ingots homeward bound from the Spanish Main, animated the Elizabethan mariners—both master and man—for piracy on the high seas was common.

Piracy is as old as trade. But piracy now got a new dignity. The Queen issued a licence, and privateering became honourable as "stealing in the Queen's name" on the high seas—a different morality. The whole business was savage, and Spain was just as culpable. Reprisals that were justified by current moralities stand condemned by the ethics of a more civilized age. What was stealing, indeed, but a redistribution of property? Hanged at Plymouth was the fate of the captured pirate. "Rise, Sir Francis!" was the Queen's reward to a privateer. The only difference between the two bloodthirsty gangsters was that Drake had a licence to be respectable. Elizabeth aided and abetted. When in 1572 Drake set sail for Panama and had great success in raiding the Spanish mule-trains from the gold and silver mines of Peru Elizabeth in



A Model of a Mediterranean Galleass (circa 1570) public disowned Drake and the buccaneers, but this outburst was only to appease Philip of Spain, with whom England was still officially at peace. But she shared the booty, took shares in these privateering expeditions, and allowed Leicester and other Court favourites to invest their money in them too.

The Elizabethan Mariners

Sir John Hawkins waxed fat on the shameful slave-trade. William Cecil, Elizabeth's great Minister, strongly disapproved of this illicit trading, but Elizabeth had no scruples. Hawkins made three voyages from the Guinea Coast of Africa with cargoes of Negroes, which he sold to the Spanish sugar-planters in the West Indies. On his third voyage in 1567, after disposing of his human cargo, he put in to the Spanish port of San Juan d'Ulloa to refit. While in the harbour a Spanish fleet appeared. It was against Spanish law for foreigners to trade with the Spanish colonies. Hawkins refused to the Spanish fleet right of entry into their own port unless they promised not to molest him. The Spaniards gave the promise, but once inside they broke their word. The odds were too great, and only two of Hawkins's ships escaped—his own and the *Judith*, which was owned and commanded by young Francis Drake. In a civilized community these privateers would be kept at home in Devon—in Dartmoor. But to judge them by our standards of ethical conduct would be to falsify history.

They were grand sailors. Frobisher and Davis went to seek the North-west Passage, which Sir Humphrey Gilbert had proved to exist in his *Discourse*, a treatise pointing the way to Cathay and the Spice Islands, but the ice and the cold defeated them. Frobisher reached what he believed to be the passage in 1576, naming it Frobisher Strait, but, later discoverers finding it to be only a bay, he renamed it Frobisher Sound, while Davis in 1585 mistook Cumberland Sound to be the channel. Oh, for a shorter route to the Spice Islands! Willoughby in 1553 tried to find a north-east passage, and he and all his men perished on the coast of Lapland. Chancellor, who set off in the same quest as co-partner in Willoughby's enterprise, reached the White Sea and penetrated into Russia as far as Moscow. It was the success of this venture which led to the founding of the Muscovy Company with its charter to trade with Russia. Chancellor too lost his life on a later expedition, but these pioneers had not sailed in vain, for they laid the foundations for a growing trade with the land of the Czars.

The search for a new route to Cathay led to the exploration of the North American coast. Gilbert perished while trying to establish the first English colony in Newfoundland in 1583. It was his half-brother Raleigh who made the first attempts to colonize Virginia, naming it after the virgin Queen, in 1607.

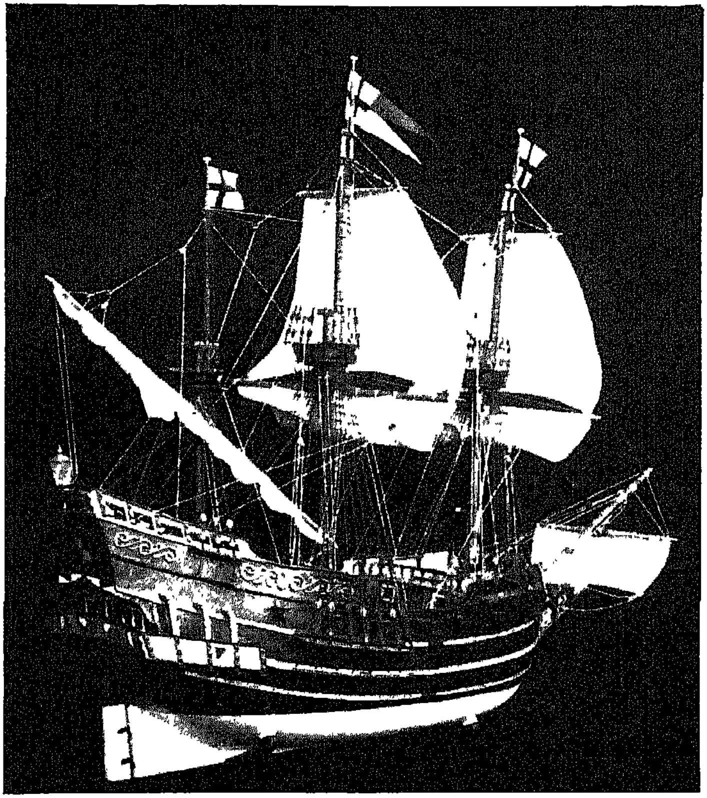
Spain lay across the routes to the Eldorado of the West, and Portugal held the keys of the routes to the riches of the East. Young, vigorous nations rising on the Atlantic seaboard were not prepared to be shut out. Since fair means were ruled out by the selfish and possessive Spanish and Portuguese policies of sharing the world between them, then other means must be followed. The heretic was determined to have his place in the sun, and this is the justification in these brutal and lawless times for the savage privateering of the English mariners. Robbery with violence on the high seas and on the territories of Spain and Portugal was the inevitable result of being prevented from lawful trading. It was this attempt to thwart the aspirations of Englishmen who saw in the fields of commerce the profits of enterprise that stimulated exploration and settlement and spurred Drake to his greatest achievement.

Francis Drake

On December 13, 1577, Drake set sail with five small ships to make a voyage round the world. His flagship, the *Pelican*, afterwards renamed the *Golden Hind*, was only 100 tons burden; then came the *Elizabeth*, of 80 tons, the *Swan*, of 50 tons, captained by his great friend William Doughty, his second in command; and the *Marigold*, of 20 tons. It was a venture beset with perils. Only one Englishman, Captain John Oxenham, had ever before sailed the Pacific, and he was captured by the Spaniards and hanged as a freebooter at Lima. Through ill-luck and misfortune Drake battled on, his crews growing more restless as the odds against success seemed to mount, until off the coast of Patagonia there was open mutiny led by Doughty. Drake court-martialled him, sentenced him to death, and, having taken the last communion with his old friend, so that he alone should be answerable to God, carried out the sentence with his own hand. Violent storms off Cape Horn scattered his fleet. The *Swan* he had set on fire after quelling the mutiny. The *Marigold* went down in Magellan Strait, the *Elizabeth* returned home, and, the gales blowing Drake's ship through into the Pacific, he pursued his course alone. He was out for plunder, and the unsuspecting Spaniards were completely taken by surprise to discover him in these waters. He rifled Lima and seized a Spanish treasure galleon off Valparaiso. Westward, ever westward, for return by the same way was impossible. Spanish fleets would be lying in wait for him. On September 26, 1580, a battered little vessel sailed into Plymouth Sound. It was the *Pelican*. She had been away nearly three years. She had defied both man and nature and written her name on the scroll of great events. The Queen knighted her "master thief"—Sir Francis.

With master-mariners as skilful as these, with sailors as tough as these, in ships that privateering had created—for the pursuit of their hit-and-run methods of robbery on the high seas had influenced design to secure speed and effective action—we had a stout defence against the slower and more ponderous Spanish Armada. The *Ark Royal* was the flagship of the English fleet, a four-masted galleon of 800 tons, the most modern of the English warships, having been built in 1587. She carried a crew of 430 and mounted 55 guns. Froude, the historian, paints a memorable picture of the Council of War, when "Howard, Drake, Seymour, Hawkins, and Frobisher, and two or three others" met in the main cabin of the *Ark* on Sunday afternoon, August 8, 1588. The epilogue to this drama of the Armada's defeat was spoken at the Court of Philip II, who received the news of the disaster with affected impassivity. "I sent you against the English," he said to his admiral, the Duke of Medina Sidonia, "not against the sea and the winds." But the power of Spain at sea was broken. By her victory England became the first maritime nation in Europe.

Spain as a Great Power was not broken, however. She still remained a great empire with territories in both the Old and New Worlds. She waged successful war against the Turks, and from the Portuguese seized Tangier in North Africa and Brazil in South America. Though the sea highways were now opened by this defeat, which removed the menace of a Spanish invasion, ships that ventured on ocean crossings had to fight their way through. But the rising young Powers of England and the Dutch Republic, by their concerted attacks, eventually created a new order with other values. They were to stand for a Protestantism not only in religion but against feudal state government. The memory of Spain's greatness resides in her cultural achievements, not her tyrannies. The old aristocracy was being supplanted by middle-class merchants. It was not the splendour of the great Spanish Empire that she ruled a world on which the sun never set—a phrase coined after the defeat of the Armada to describe the dominions



A MODEL OF THE "GOLDEN HIND"

This illustration is reproduced by courtesy of Mr R. N. Davis, of Filton, Bristol, who is the maker of the model.

of Philip II—or that she enjoyed the fabulous wealth that poured into her princes' coffers, but the splendour of her art and literature that enriched mankind. She gave us Cervantes whose Don Quixote laughed out the Age of Chivalry, Calderón and Lope de Vega, whose dramas rivalled the works of the Elizabethans and Molière. She gave us Velasquez, El Greco, welcomed from Greece, and Murillo, whose paintings rival the Dutch and Italian masters. But the Renaissance in Spain burned itself out. The empire crumbled, old age dried up the fountains of energy. It was in England, where the twin forces of the Revival of Learning and the Reformation fused during the Tudor age, that we get the fullest and richest life.

The tides of vigorous creative life ran high. "Men are fools who wish to die" was the burden of the Elizabethan song. On "silver-streaming Thames," busy with merchandise, gay, silk-covered tilt-boats full of merry-makers sailed up and down to the music of viol and flute. In the Pool and at Deptford the ships that had come home from the far-off countries found their berths, and in the black-fronted taverns traveller's tales were told of "cannibals that each other eat" and of "anthropophagi and men whose heads do grow beneath their shoulders," of fabled wealth beyond all dreaming. Here seamen were hired for adventuring on the Spanish Main. The fashion of the day showed the interest in travel. Portia remarked of her English suitor, "I think he bought his doublet in Italy, his round hose in France, his bonnet in Germany, and his behaviour everywhere." Men realized for the first time the rich melody of their native tongue and the pageantry of colour and words, the music of harmonious rhythm and form, the beauty that imagination and feeling can discover.

It was the age of Marlowe and Shakespeare, and the mystery and magic of the sea and tropic islands inspired some of their greatest passages. It was the age of that lovely polyphonic music which is so essentially English; the Latin Church music of William Byrd and the lovely anthems of Orlando Gibbons. Did not the great Sir Francis take his musicians into his ship's company? Their dress, their furniture, their houses, their ships have a quality of beauty expressive of the Elizabethan's zest for life. Look at their galleons—how picturesque they are! Their stern and beak-head decorations, carved and gilded, having all the enchantment of a new awakening to the human form and the symbolism of sea goddesses, revealed more than pride of craftsmanship and pride in the vessel; they revealed an instinct for beauty. For in these Elizabethan decorations there is none of that baroque extravagance symptomatic of the spirit's decay. Pre-eminently England realized, in Browning's words:

> The world—
> The beauty and the wonder and the power,
> The shapes of things, their colours, lights and shades,
> Changes, surprises . . .

"But all this ornamentation is all so useless," says the man who can see nothing but in terms of efficiency. The most precious things in life *are* useless. What is there 'useful' in a Gothic cathedral, in Hamlet, in Beethoven's *Ninth Symphony*? What is there useful in a vision of blue sky through a screen of apple-blossom? "Consider the lilies of the field!" Can we not distinguish between wealth and 'illth'? Ruskin's question strikes at the roots. There was a dark and seamy side to Elizabethan life, and the age had its brutalities and superstitions. But are we, with all our efficiencies, essentially any happier? Have we the zest and the exhilaration of the Elizabethans in living?

A New Literature of the Sea

The adventurous seaman was to open up not merely new countries but a new literature. The call of the sea thundered grimly through the Saxon *Beowulf*, but it was not heard again authentically till Elizabethan times. Richard Eden compiled a book on navigation. Clement Adams wrote the story of Sir Hugh Willoughby's tragic fate in the North-east. Sir John Hawkins briskly recorded his experiences, and philosophically meditated over them. Sir Humphrey Gilbert wrote a *Discourse of Discovery*. Frobisher's adventures were vigorously described by Captain George Best.

But it was Richard Hakluyt—a true-born Englishman in spite of his name—who was the father of the literature of the sea. His great compilation, *The Principall Navigations, Voyages and Discoveries of the English Nation*, is the 'Bible' of English nautical history. His employment by the East India Company is not without historical importance as showing the romantic interest of 'big business' in those days. Professor Walter Raleigh has shown, in a brilliant essay, how pervading was the inspiration of this quest for adventure. The sea chronicler, simple, unaffected, and direct has been the forerunner of the novelist. Who has not read Stevenson, R. H. Dana, Marryat, Clark Russell, F. T. Bullen, Conrad, Masefield, Kipling, E. M. Forster, O'Neill, Morley Roberts, or that wild, undisciplined masterpiece *Moby Dick*, by Herman Melville, knows not the splendour of the literature of the sea.

The defeat of the Armada opened all England's highways of the sea, though every ship had still to fight her way. Queen Elizabeth's legacy was not only to leave her country the supremacy of the seas, but the finest of ships afloat. In his *Judicious and Select Essays*, Sir Walter Raleigh stated what he considered the qualities of a good ship should be. She must be stout, swift, and seaworthy, be given a good length forward, and not sink so deep in the water as to drag. The "cook-roome" should be in the forecastle because of the risks of fire, and not a brick-and-mortar cooking-galley in the waist, as was a common warship practice. Yet the development of the art of shipbuilding in Tudor times had been too rapid to last. Both for designer and shipwright it was still largely a matter of precedent. Still more was ship's design an unconscious sense, born of experience, rather than a studied science of scale measurements.

In early Stuart times, after the experience of the great Elizabethan sailors, so invaluable to the builder, had been lost, ships were less seaworthy; often they were too high out of the water, sprang leaks too readily owing to overstrain, and carried their sails badly so that they were difficult to steer and awkward to handle in a rough sea. Ship-design and largely ship-construction was a secret art passed from father to son. A contributory cause of the decline was the influence of orders placed by non-seagoing owners, and the replacement of such practical naval administrators as Sir Richard Hawkins by Court favourites like Buckingham. The growth of corruption in the national services following Elizabeth's death was still another cause.

The foundations of England's commercial supremacy were laid by the chartered companies, to which Elizabeth granted monopolies. The Muscovy Company conducted and controlled all the trade from Archangel to the Persian Gulf, the Levant Company all her trade in the Eastern Mediterranean. This company built a fleet of strong, stout, well-armed ships capable of beating off the Spanish galleys. They commanded a fleet of nearly thirty ships, with a total of over five thousand tons, and their imports of fine goods realized handsome returns. In 1600 the East India Company was founded. Known as the "John Company" or the "Honourable John Company," and hiring at first a fleet of only five ships, it held a charter from the Queen granting it a monopoly to trade with India and the Far East. These monopolies were fiercely contested by private traders, to whom the Government had to make concessions, but these 'interlopers' were not favoured by the Crown.

The chartered companies, acting in the capacity of a sort of unpaid civil service, collected customs dues and managed foreign trade, thus relieving the Government both of responsibility and expense. The grant of a monopoly in the spice-trade to the East India Company was almost the last act of her reign, and outside commercial circles it passed almost unnoticed. Yet that event marked the beginning of the greatest of all the chartered companies, whose history is intimately linked with empire development. The privileges of monopolies stimulated investment and provided the large sums needed to build ships capable of making long voyages and arming them to meet the attack. The founding of the East India Company was the Englishman's reply to the monopolistic trading of the Dutch, who had forced up the price of pepper from three shillings to eight shillings a pound—a price which put it out of the reach of most English consumers.

The Dutch, like the English, had determined to capture trade even at the point of the cannon's mouth. They ousted the Portuguese and secured settlements at the Cape of Good Hope, Mauritius, Malacca, and the Malay Archipelago; and in the rich Spice Islands, which produced the cloves, mace, nutmegs, and pepper, they shut out all competitors, even their English allies. Ruthless in their determination to keep this profitable market in their sole possession, they used every method, scrupulous and unscrupulous—diplomacy, fighting, and even massacre—to expel competitors.

The English East India Company met in the Dutch a formidable competitor. With this Anglo-Dutch rivalry the East ceases to be the monopoly of princes—the East that had filled their coffers and loaded their tables; the East that had provided incense for the altar and perfumes for vanity. Now it was the scene of ruthless expansion and development, the field for exploration and exploitation by aggressive merchant adventurers. It was no longer the prize of princes but the profitable investment of joint-stock companies. England has been called a nation of shopkeepers. It was the chartered companies who prepared the way.

CHAPTER IV

SOVEREIGN OF THE SEAS: I

(1400 TO 1700)

First Claims to Title—Fish in the Middle Ages—The Hanseatic League—Tudor Shipping—East India Company—Rise of the Dutch Wagoners of the Sea—The Pilgrim Fathers—Dutch Contribution—Scourge of Scurvy—Piracy—Rise of France.

> No nation was ever ruined by trade.
>
> BENJAMIN FRANKLIN, "Thoughts on Commercial Subjects"

> There are always ships putting into, or sailing out of, harbour.
>
> ARISTIDES, *Sacred Speeches*

SOCIAL habit is one of the determining factors of history. In the Middle Ages it was the general habit to eat fish; first, because of the scarcity of fresh meat, and second, because the people were Catholic and orthodox in religion, strictly observing the many fast-days. Local supplies were insufficient to meet the demand, and these had to be supplemented by salted and pickled fish brought to the country markets from the coast, where there was a considerable fishing industry. The monks in the monasteries regularly fished the rivers and streams, and when Henry V sailed out from Southampton for Harfleur in 1415, with the biggest fleet that had yet gathered in Southampton Water, the good friars of Woolston sorely complained of the interference with their supplies of salmon. Pirates invaded the fishing-grounds and molested fishermen, for their catches were worth stealing.

It was in order to control this piracy off the English Channel coast that the Cinque Ports—Hastings, Hythe, Dover, Sandwich, and Romney, which formed the inner circle of the Confederation—and the "Ancient Towns" of Winchelsea and Rye were established, and it was their duty to furnish men and vessels for the policing of the seas. By the thirteenth century England's prerogative to guard the legitimate shipping in the North Sea and English Channel was recognized, and in 1295 Edward I sent three ships to Jernemuth—Great Yarmouth—to protect the herring ships of Holland and Zeeland. English seamen-adventurers were even in Saxon days bartering merchants, as the title "Thane most worthy" in the tenth century shows, and so remained in the fourteenth century, as Chaucer's *Shipman's Tale* indirectly reveals. Edward III's victories over the navies of France at Sluys in 1340, and those of Spain at Winchelsea in 1350, made him the acknowledged sovereign of the seas, and all the opportunities for developing an important and enriching sea-borne traffic seemed to be present.

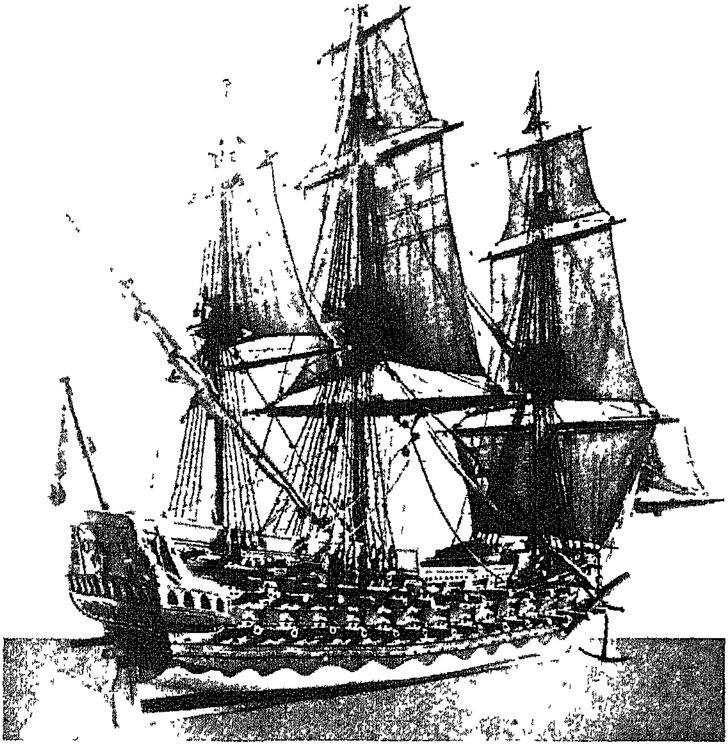
In the list of stores carried by the king's ships in the war with France we have one of the earliest mentions of iron and brass cannon, but there is no evidence that they were used. All the naval engagements in the reign of Edward III seem to have been fought without the use of artillery. Indeed, guns were still very uncommon in the early days of the fifteenth century. They were all murdering pieces, breech-loaders until Henry VIII's day. It was still the land-battle at sea; the object being to kill the crew rather than, as in true warfare, to sink the ship. It was the invention of portholes by Descharges, of Brest, in 1501 that made it possible to carry big guns on the lower deck, leading to muzzle-loaders being invented to smash ships as well as kill crews, thus revolutionizing naval architecture.

The great sea-fight off Sluys opens an almost unbroken series of victories by English armies in France, which lasted nearly twenty years, and included the familiar names of Crécy and Poitiers. Sluys was the first of those major naval successes which in years to come were to make England the great sea Power, of which the names of Blake and Nelson were symbolic. Henry V, whom Shakespeare made the theme of "a national anthem in five acts," gave a real impetus to shipbuilding. Influenced by Genoese and Spanish ships, and by the introduction of cannon, which required deeper and more stalwart vessels able to carry the weight and withstand the shocks of firing, he favoured vessels with more than one mast. These were the forerunners of the Tudor ships. It was during the Tudor period that England took her place in the forefront of maritime Powers.

But the opportunity offered by Edward III's naval victories was lost, and England had to wait nearly two centuries for the Tudors. England became involved in what is known as the "Hundred Years War," which, while it made for the growth of national consciousness, and began that process of separation from Rome which the work of Henry VIII completed, absorbed the nation's energies and left little time for the development of peace-time industries. It did, however, foster rather than discourage shipping, as ships were needed both for fighting and transport. Then followed that long and horrible contest between Yorkists and Lancastrians called the "Wars of the Roses," which decimated the two parties in turn. For a quarter of a century this civil war brought its train of barbarism and ruin. The victory of the Lancastrian Henry Tudor at Bosworth Field ended the line of the Plantagenets, who had reigned for over three centuries, and his election in 1485 as Henry VII founded the Tudor dynasty.

The "Hansa" Merchants

But the general life of the people went on in spite of the wars. Who was catching and distributing the fish? Who was doing the normal carrying trade? This all fell into the hands of the Hanseatic League. The origins of Hansa are obscure. At first they were nothing more nor less than 'receivers' in league with pirates, marketing their stolen goods. In course of time this group of merchants, hailing from Cologne, Lubeck, Hamburg, Bremen, and other German cities, grew powerful. They were held together by strictly closed, almost caste-like, patrician, ruling classes. Hansa turned on its former allies, rooting out piracy and convoying its cargoes with armed ships. These merchants dominated all the sea routes outside the Mediterranean and practically monopolized its trade for nearly three centuries. They established themselves by their victorious war with Denmark in 1370, which gave them command of the Baltic and of the important herring fishery. The merchant guilds, or Hansas, all combined in a league which included nearly a hundred cities. Both England and France were anxious to keep on good terms with them, for they supplied not only salted and dried fish for the people at home, and the victualling of armies in the field, but all the products of the forest industries, timber, pitch, and tar, so essential for shipbuilding. The Thames-side yards had long exhausted the supplies in their immediate neighbourhood because they were being kept busy providing for a large proportion, at least, of the tonnage required for the transport of troops.



A Model of the Hansa Ship "Die Hoffnung" ("The Hope") (circa 1680)

By courtesy of Museum fur Kunst-und Kulturgeschichte, Lubeck

These Hansa merchants did not sail the seas themselves. They were middlemen, taking in the catches of Swedes and Danes at beggarly prices, then salting and curing the fish and distributing it at handsome profits to feed Christendom. They were ruthless and cunning in their methods. By infiltration, peaceful penetration, and bribery—

their representatives were subject to severe disciplinary control from the centre—they secured an economic stranglehold on weak states. They gripped the trade from Russia to Portugal, and tapped the overland caravan routes from the East through Nijni-Novgorod, though there was none of the colour and romance of the Levantine trade of Venice and Genoa. Cologne was the *entrepôt* for the Eastern trade. Their sailors coasted the bleak grey seas of the Northern waters, and while Spain and Portugal were trying to find the great ocean routes they were increasing their fleets, enlarging their industries, buying, selling, bartering, and creating monopolies.

Fish is a bulky cargo, and its transport required big, stout ships. Hansa became famous for its ships. On a few occasions the Hanseatic League sold vessels to the English Navy, and when Henry VII was founding his Mercantile and Royal Fleet he purchased six of them, turning to Hansa when he could not get better-built ships from Genoa and Spain. Hansa carried not only pickled and dried herring, cod, and "kegs of salted sprats," but also barrels of beer brewed in their home-towns—a universal drink in northern lands. They carried hides and skins, tallow and flax for caulking, and tall pines for masts and boards for planking. From Russia they brought furs for the nobility and wax for the altar candles of the Church. From Sweden came building stone, iron, and copper, and from Flanders lace and linen cloths, woollens, and flax, though the Hanseatic merchants had a healthy respect for the Flemings—those peasants of the seas—in their flat-bottomed boats who refused to let Hansa's monopolies go unchallenged. Hemp and honey—for cane and beet sugar were unknown—anything that had a market in the one hundred and thirty trading posts (of which London was one) that they maintained Hansa carried and sold. No wonder they were powerful politically as well as socially.

It is interesting to note that the names of the Hansa ships at the peak of their power had no religious associations, an indication of their secular outlook and breach with the spiritual tyrannies of the age. In 1402 Simon of Utrecht, sailing in the *Brindled Cow*, captured the leader of the daring pirates known as the Victual Brothers, whose exploits have passed into romantic legend like those of our outlaw Robin Hood. The *Brindled Cow* was probably one of the first Hanseatic ships to bear a secular name; this heraldic name was also used for warehouse signs. In Lubeck up to the outbreak of the last war there was a full-scale model of a typical Hansa ship moored at the quayside. In the town was a restaurant, whose beams, panelling, tables, and chairs were said to be made from the timber of Hansa ships. Be that as it may, the large dining-room was adorned with many models of the time, together with such relics as lanterns and bells. The "Frauen-Kirche"—Church of Our Lady—contained many coats of arms belonging to the Hansa Merchant Princes.

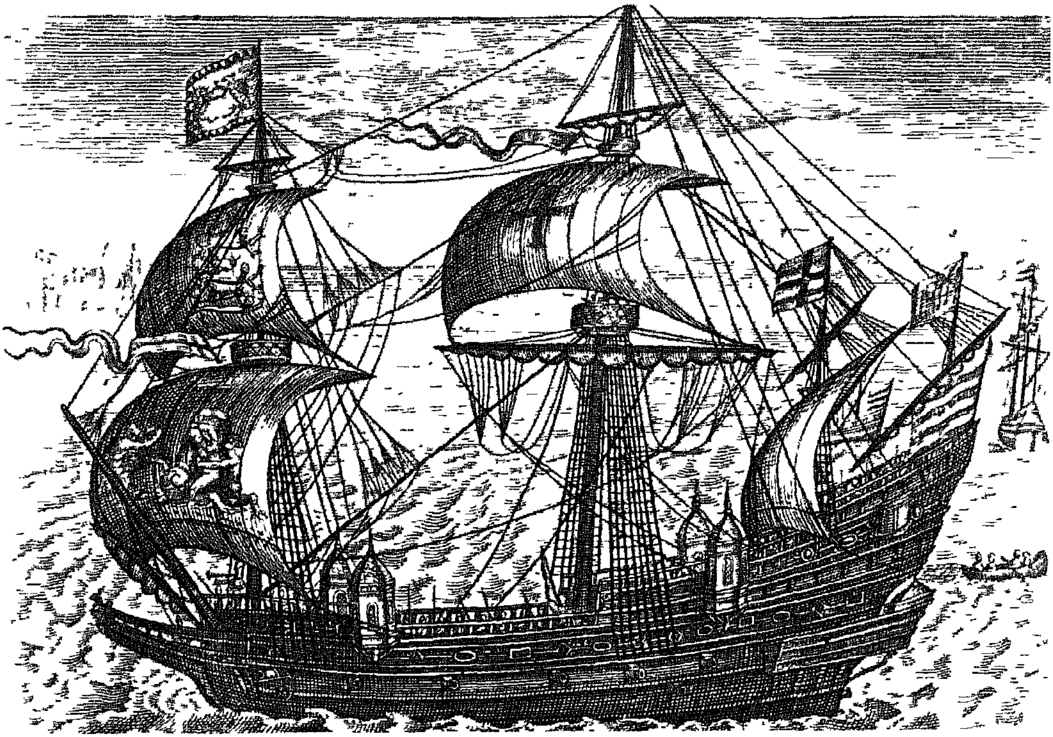
In the great Thirty Years War between the Roman Catholics and the Protestants, which began in 1618 in Bohemia, and raged from end to end of what is now modern Germany till the Treaty of Westphalia in 1648, Hansa was ranged against the Papacy, but it was the end of the League which had existed for nearly three centuries as a European Power. In that fearful religious conflict three-quarters of the entire population met its doom, and towns and villages, ports and industries were reduced to rubble and ashes. Bismarck stated that Germany still suffered its effects, and the Nazi leaders of the Second World War tried to give their people some comfort and fortitude during the devastating Allied attacks by recalling the Thirty Years War.

The Tudor accession of Henry VII marked not only a change in the ruling houses but in English policy. Henry set out to make England an important European Power, and his first measures aimed at making this country self-supporting. He set a prohibitive tax on the export of wool, encouraged Flemish weavers to settle here, and thus Englishmen developed the cloth industry. He passed a Navigation Act forbidding foreign ships to load in English ports while an English vessel was unfreighted, and it further stipulated that the Gascon trade must be carried in ships manned by Englishmen. Thus he encouraged English merchant shipping and built up a substantial merchant fleet. In 1508 he accused Hansa of evading his Navigation Act by illegally exporting woollen goods to Burgundy, and he made this the excuse for the seizure of their pledge money, which amounted to £20,000.

The Hansa merchants were gradually squeezed out of the English market, and a similar policy was directed against the powerful Venetian Republic. He organized a tariff system to shelter home industries, a "mercantile system" that remained the economic policy of this country until the middle of the nineteenth century. In the great European wars for the conquest of Italy between the Emperor Maximilian, Charles VIII of France, and Ferdinand of Spain he remained neutral, and by cunning diplomacy consolidated his position, and England became a Power to be courted. Henry VIII, shrewdly steering a course through the bitter religious fanaticisms that wrought such havoc on the Continent, saved England from civil war. He succeeded in effecting a breach with Rome, plundered the coffers of the monasteries which he dissolved, and built a fleet that laid the foundations of the British Navy. The Spanish marriage of his daughter Mary with Philip of Spain in face of public opinion, and the heretical persecution of her reign, lit a candle of Protestantism that made Spain henceforward England's foe. Elizabeth's foreign policy succeeded in holding off the Spanish menace until in 1588 the great issue was fought out.

English Ships and the Armada

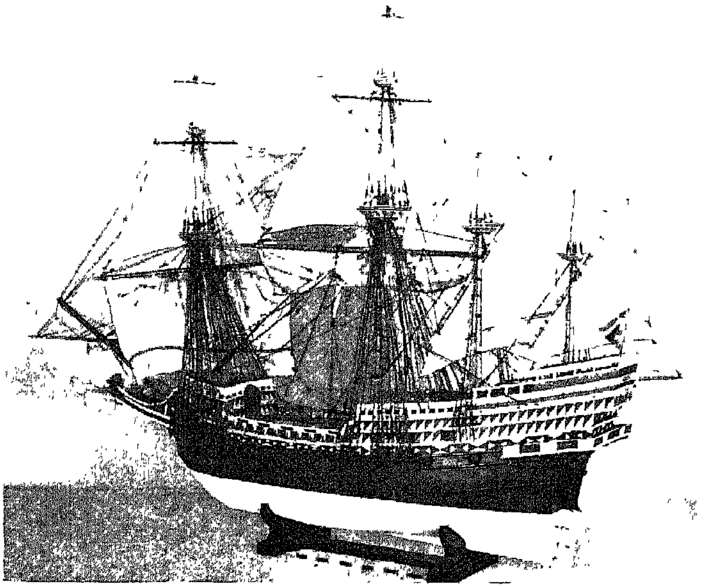
The defeat of the Armada has provided a text for endless commentaries. Why did not this major naval victory bring the rich rewards it promised? In a few years the business of the Hanseatic League was in liquidation. Italy was in ruins, and the Republic of Venice was now only an inland Power. As sovereign of the seas the opportunity passed to us. We had the ships, for Hawkins, as Treasurer of the Navy, had introduced many improvements to ship-design, including the use of the topmast. He was the genius who supervised the dockyard construction, and the experience of a generation of privateering emphasized that mobility and seaworthiness are the first qualities of a ship. Fast ships had been developed to carry 'perishable' cargo—fruit and slaves. It was this speed and weatherliness on which the superiority of Hawkins's ships was based. His warships could outsail the great sailing galleons of the Spaniards. The great floating castles of the Armada had only fore-and-aft guns, while Elizabeth's ships fired 'broadsides,' raking the Spanish galleons before they could draw near enough to grapple. "The English ships," wrote Froude, the historian, "had the same superiority over the galleons which steamers have now over sailing-ships." But the victory over the Armada was frustrated by civil strife, and again, as after Sluys, we had to wait two centuries to make the title "Sovereign of the Seas" a reality. The explanation is in the character of Elizabeth. Swinburne, with a poet's insight, penetrated to the secret of her success: "The saving salt of Elizabeth's character . . . was simply this, that overmuch as she loved herself she did yet love England better."



THE "ARK ROYAL," 1588

This illustration is reproduced from a copy of an engraving by courtesy of the Trustees of the National Maritime Museum, Greenwich

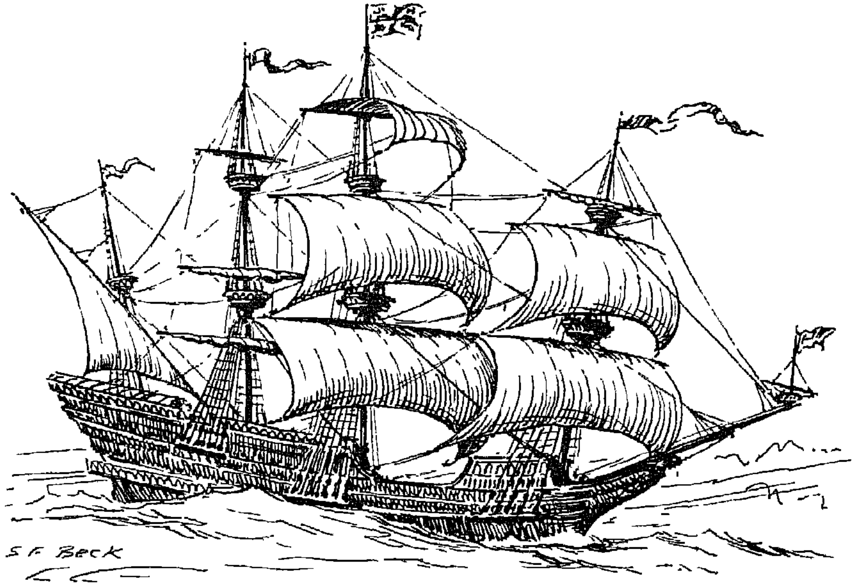
The ships that routed the Spanish Armada were mostly hastily converted English merchantmen of all sizes, running down from the four-hundred-ton, galleon-built *Marchante Royale* and *Galleon Leicester* to little cockle-boats of twenty tons. Of the fleet of one hundred and ninety-seven ships commanded by Lord Howard of Effingham only thirty-four belonged to the Navy. But the finest of the English warships were equal in size and armament to the biggest of the enemy's galleons The *Triumph*, commanded by Sir Martin Frobisher, was over 1000 tons, and only four ships in the Spanish Armada were bigger. The *Ark*, the English admiral's flagship, was 800 tons, while the *Elizabeth Jonas* was 900 tons. It is true, of course, that Spanish ocean-going ships of the sixteenth century were much larger than the general run of English merchantmen. They were plying over regular routes to the Spanish Main and carrying big cargoes, while English ships were only engaged in sporadic adventuring, and not until the end of the century was the need felt for big vessels. The irregular exploits of the privateers developed a ship speedy, seaworthy, and handy, and it was this experience which gave the converted English merchantmen in the English fleet so great an advantage over the Spanish vessels. The majority of the English ships were under 100 tons. While the Spanish fleet greatly outnumbered the English in large ships, the English outnumbered their foe in small ships. The deciding factors in this great naval encounter were the better seamanship and better design of the English vessels, together with that passionate ardour to defend the English soil from the hated invader which is a spiritual force that is incalculable.



AN ELIZABETHAN GALLEON (CIRCA 1600)

From a model in the Science Museum, South Kensington Crown copyright

In the Pepysian Library at Magdalene College, Cambridge, are scale-drawings of sixteenth-century ships drawn by Matthew Baker about 1586, and from these *Fragments of English Shipwrighhtry* we get the most precise information we know of the construction of vessels in this period. The shipwright's draughts are all of galleon-built vessels—fine-lined, long in relation to breadth, without a projecting forecastle, as in the carrack, and a stem which fined into a long beak. From these draughts, which include plans, sections, and elevations, a scale-model of a typical, large Elizabethan ship has been constructed, and it may be seen in the Science Museum, South Kensington, London. It depicts a vessel 142 feet long, 38 feet beam, 18 feet depth of hold, and a tonnage of 855. It is galleon-built and reveals a marked sheer, or upward curve of hull towards bow and stern, very characteristic of Elizabethan ships. The superstructures fore and aft are not prominent; there is still no continuous deck running the whole ship's length. She is four-masted, the two mizzen masts being much shorter than mainmast and foremast, and she carries a spritsail beneath the bowsprit topsails and topgallant sails on fore and mainmast, but the mizzens carry neither. The sail plan and rigging were copied from later manuscripts. The hull is gaily painted in exact replica of one of Baker's coloured drawings. Ships carried elegant figure-heads—dragons and lions rampant being the usual symbols—but there was none of that fantastic carving which the decorators of seventeenth- and eighteenth-century ships indulged in. The shape of the ship is efficient, the decoration fits its subject. The model creates the impression that such ships were built by men familiar with the hazards of the sea.



A Spanish Galleon, *circa 1600*

The defeat of the Armada in 1588 was the brilliant apotheosis of a great political experiment, but the age of the dictator, however wise and beneficent, was over, not only in England but in most of Europe. Love of the Queen prevented any violent disturbances, for no one wished to cloud the closing years of a great reign. But Parliament was ready now, as it had never been before, to assume the responsibilities of government, and at her death firmly asserted its rights. This precipitated a struggle between the Crown and Parliament which ended in a civil war and cost a king his head. Yet, in fairness to Charles I, he did recognize the importance of sea-power and was aware of the growing ascendancy of the Dutch. To this end, following an ancient precedent, he levied the tax of 'ship-money,' and John Hampden's resistance to this non-parliamentary measure is historic.

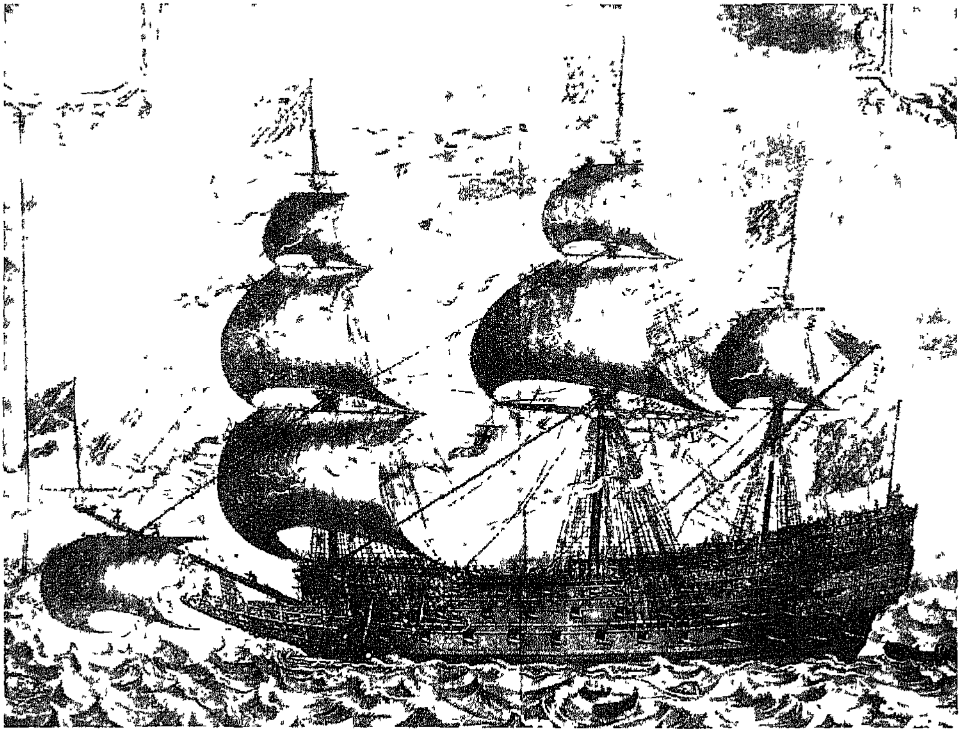
The King's determination to provide his country with a strong sea-defence was worthy enough, but the manner of his imposition was unworthy. One must not only do justice, said Lord Hewart, but it must seem that justice is done. Charles did, in fact, add a series of "Lion's Whelps," carvel-built and not clinker-built, fitted with three masts and square sails, and emulated the Dutch practice by making them long and slight. Unfortunately, owing to lack of funds and gross fraud by the contractors and jealousy on the part of the King's officers, who were determined they should not succeed, green wood instead of seasoned timber was used, and they were fitted with faulty rigging and too-heavy ordnance, so that these ships were quite unserviceable. It was in this reign too that the great 1650-ton ship the *Sovereign of the Seas*, the admiration of both France and the Low Countries, was built; but, again lacking the expert guidance of the skilled Elizabethan mariners, she was so cumbered with rigging and superstructure that during the Commonwealth she was completely remodelled, and only then, under Blake, lived up to her name.

"Sovereign of the Seas"

The *Sovereign of the Seas* has been described as the first three-decker man-of-war, though actually that honour belongs to the *Prince Royal* launched in 1610, twenty-seven years previously. Both these vessels were designed by the celebrated shipwright, Phineas Pett, the Commissioner at Chatham Dockyard, and the *Prince Royal*, with its proportions of length roughly four times its breadth, its elaborate decoration, and picturesque appearance, had won general approbation. But the *Sovereign of the Seas*, which was laid down at Woolwich in 1636 and successfully launched on October 13, 1637, after an abortive attempt had been made to launch her in September, had many unique features. She carried royal sails on the foremast and mainmast and a topgallant sail on the mizzen, innovations to the British warship of Stuart times. The royal sails had been fitted as early as 1600 to merchantmen, though this particular rig was very slow in winning general acceptance. She carried three tiers of guns like the *Prince Royal*. On the draft that was accepted for her building it was fixed that her tonnage "should be 1466 by depth, 1661 by draught, and 1836 by beam," but what is exactly meant by these phrases we do not know. She had a chequered history. She was rebuilt in 1659–60 and again in 1685, and there is a fine contemporary print of her in the Science Museum, South Kensington. The great ship was destroyed by fire in 1696.

The East India Company in Stuart Times

The big ship was much encouraged by the East India Company for obvious reasons, though the Stuart builders lacked the experience and the science to build her successfully.



THE "SOVEREIGN OF THE SEAS," 1637

From a contemporary engraving by Phineas Pett in the Science Museum, South Kensington Crown copyright

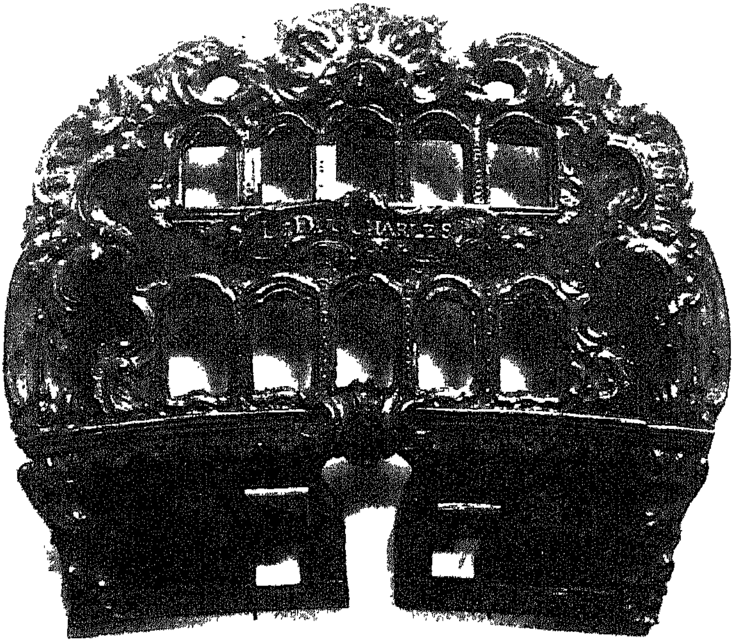
The Company, because of the extortionate prices asked by vendors, who sought a huge profit at the expense of the merchant-adventurers in need of ships to develop their monopoly of overseas trade with India, established their own shipbuilding-yards. Some East Indiamen were built of Burmese teak in India. At Deptford they maintained huge timber stocks and shipbuilding equipment, employed over five hundred men, and broke the back of the shipbuilding ring that had refused to sell them ships except at preposterous charges. Soon they were building more ships than any other shipbuilders. Their Deptford yard carried out the requisites not only for the building of ships but also for the making of necessary guns and munitions, for armaments were standard requirements for all ocean-going ships. At the yard crews were recruited, admittedly by dubious methods judged by our standards, though at that time the press-gang, the crimp, the shanghaiing of drunken men, the kidnapping of men freshly returned from the sea, were the recognized and understood means of securing crews. This, at least, can be said. The East India yard was for the times a model of good organization, and the Company showed humanitarian interests that stand in sharp contrast with the prevailing, general attitude to such matters. True, the Company was making vast profits from its ventures. The first expedition led by Lancaster paid 95 per cent. and the third venture resulted in the huge dividend of 234 per cent. Perhaps the most fantastic profit ever recorded for these Eastern ventures was that made by Vasco da Gama's expedition, which on its first voyage to India paid 6000 per cent. But it is to their great credit that they took a genuine interest in welfare-work, paying pensions to widows and orphans, maintaining a staff of "Skilfull and honest chirurgions"—the only surgeons in the merchant service—and in the yard itself, anticipating modern practice, it ran a canteen where the workmen could buy bread and milk, butter, eggs, cheese, and "pease," and ale at a maximum price of three pints for a penny. There were "cakes and ale" for the employees of the Company. The mercantile marine was then regarded as the dump of all the riff-raff, the criminals, drunkards, ne'er-do-wells, the flotsam and jetsam of the seaport towns, and this interest in the well-being of their employees shown by the Company did something that "shines like a good deed in a naughty world." For the general conditions, especially at sea in Stuart times, were appalling.

The Company's first efforts at building big ships were disastrous. On December 13, 1609, King James I witnessed the launch at Deptford of the largest merchant ship yet built in England, the *Trade Increase*. She was far ahead of her time, and too big to be handled properly in her day. This 1100-ton ship, cumbrous and top-heavy, ran aground on her maiden voyage near Mocha, in the Red Sea, and at Bantam, in Malaya, which she eventually reached, she was careened—that is, turned on her side —(a usual practice) to clean the hull. The unwieldy monster got out of control, and one account, probably an exaggeration, gives the loss of life as 1000 men. Her sister ship, the *Peppercorn*, was equally a failure, being unseaworthy and unmanageable. By 1617 the policy was reversed, and the Company's ships had a tendency to grow smaller. These first East Indiamen were clumsy and hove to at night, and as a result made slow passages. They usually carried four masts, all square-sailed except the mizzen. They were squat and wide, with low bows and high sterns. The relationship between sail area and size of vessel had not been properly studied; consequently these ships were always in danger of capsizing in a squall or when a heavy beam wind was blowing. Extra beam increases stability.

Changes in Rigging and Stern Decoration

Changes in the rigging followed. The 'spritsail topsail' appears after the aftercastle had been moved from the poop. It was fixed at the forward end of the bowsprit on a topmast. By 1618 the 'bonaventure,' or second mizzen-mast, had gone out of use;

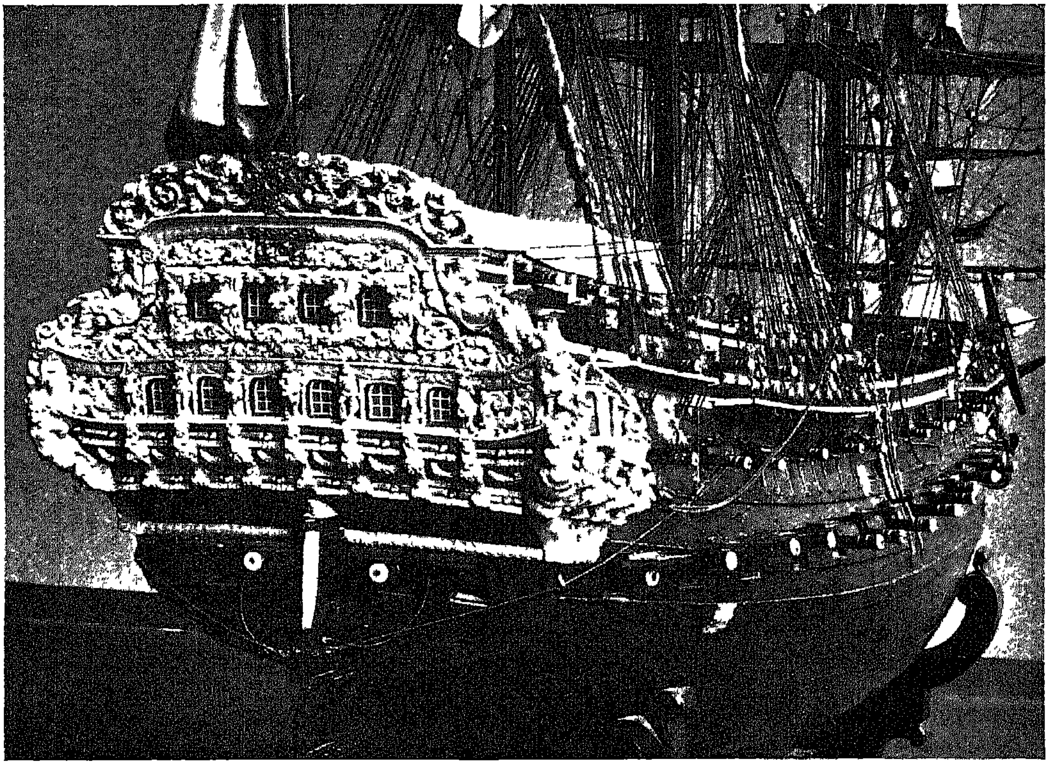
an increased sail-area was obtained by increasing the size of the mizzen-mast and by replacing the lateen topsails and topgallants by square sails. Perhaps the most important development was not in the rig but the hull. Hull design remained substantially static, but the English did introduce the 'round-tuck' stern, where the planks were brought up and round from the bottom to about ten feet above the water-line and then squared off. By 1650 this 'round-tuck' stern was in general use in English ships. Foreign shipbuilders did not abandon the square-transom stern until the end of the century.



THE STERN OF A SEVENTEENTH-CENTURY FRENCH SHIP, SHOWING ELABORATELY CARVED DECORATION

What a plethora of sails! With the fighting turret gone that had survived the Middle Ages by nearly a century and a half the balance of the ships had been disturbed. The poop no longer looked like a castle towering high above the seas. To gain compensating weight in front the bowsprit was lengthened, and a number of yards were attached to it and given sails of their own—spritsail, spritsail topsail, spritsail topgallant-sail. To set them men had to climb all over the bowsprit, like monkeys on a stick, working with martingale guys and stays in a soaking spray. What useful function the little topmast at the very end of the bowsprit performed, or however it was kept in position, even with plentiful shrouds and braces, is beyond comprehension. It disappeared by the end of the century. The removal of the useless forward projection, and the lacing of the luff to the mast, resulted in the spanker, and later the driver.

This development of multiple sails had some logical justification, but there was none for the frantic extravagance that began to mark the decoration of ships, unless it be that this ornate embellishment was calculated to impress by its ostentatious show of wealth. The prow of a vessel had been ornamented from ancient times, and the figurehead probably originated in the need for a buffer, or fender, in case of collision. The seventeenth century discovered the stern as a field for ornamentation, and it became a sort of monstrous museum of wooden sculptures. This incongruous rococo work, with its misplaced craftsmanship, finds its counterpart in the multitude of effigies stuck on contemporary baroque architecture, and in the excessive ornamentation of furniture and silver. It was a fashion which originated in the splendours of the French Court of Louis XIV and became the mode for Europe to copy. This ornateness of ship's ornament reached its most absurd lengths on French ships.



THE STERN VIEW OF A MODEL OF A SIXTY-GUN TWO-DECKER DUTCH SHIP (1698)

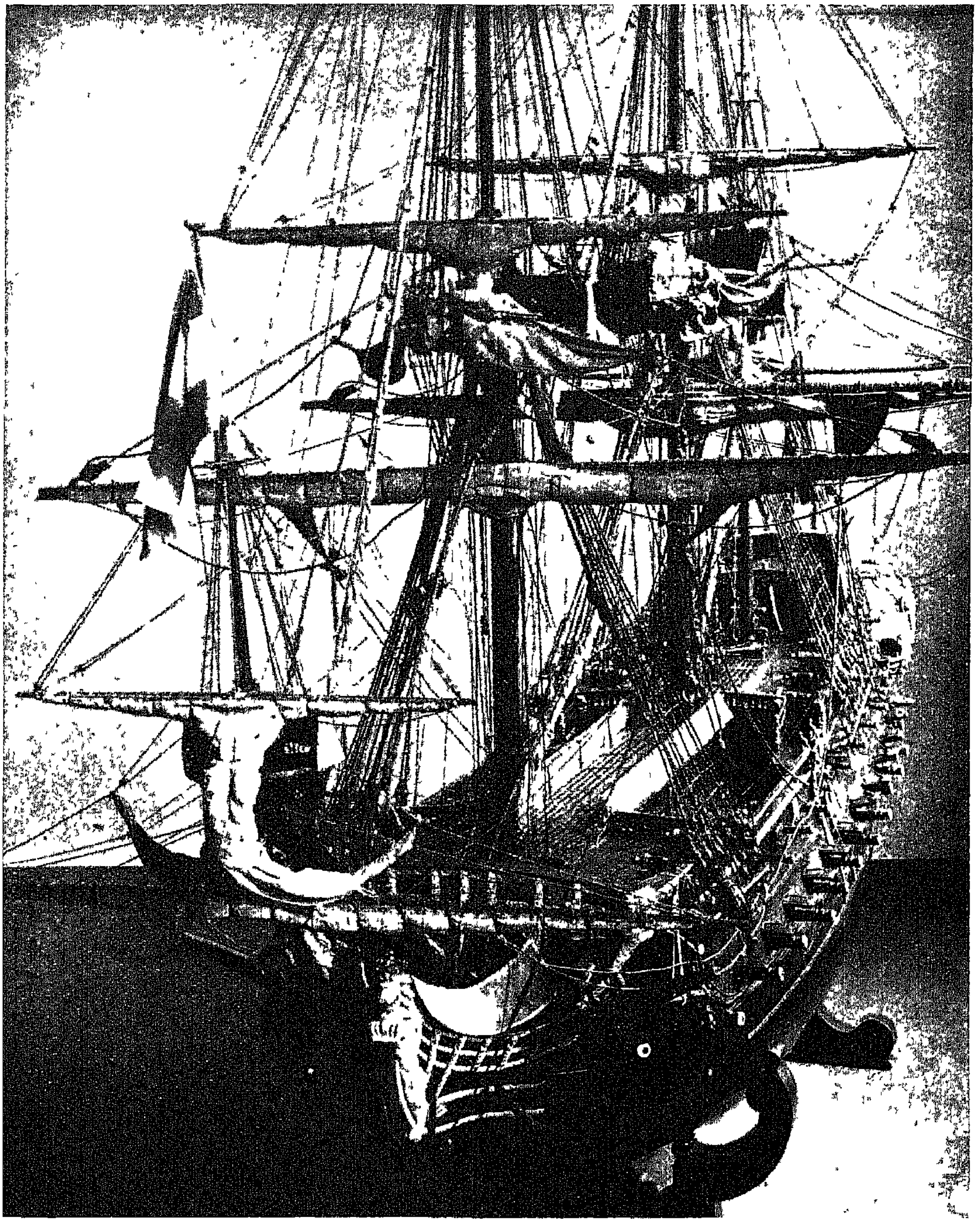
By courtesy of Ryksmuseum, Amsterdam

This ostentation was symptomatic of a growing assertiveness and intenser stress on material values. The age was in the throes of creation, as yet uncertain what it would create. The organized state, the nation, the sense of individual consciousness, the awareness of the benefits of trade, and the impulse for power were being born. In England we see it in the violent protests against courts-martial and the press-gang, and in the passing of the Petition of Right in 1628 by the third Parliament of Charles I, defining his powers. We see it too in the rise of the merchant companies, in the policy of colonial expansion—for no sixteenth-century colony took permanent root in North America—and most vividly is it expressed in the Puritan revolt. The complex antagonisms of nationalism, religion, and empire shook Europe, blazing up in Germany in the Thirty Years War with greater ferocity than ever in 1618, expressing itself in the Netherlands in the resistance of the Dutch Protestants to Catholic Spain, in Bohemia in a nationalist and religious rising that had to wait for the creation of Czecho-Slovakia in our time for a solution, in France in the nationalist ambitions of Richelieu and Mazarin—and out of it all the Dutch emerged as the happiest and strongest nation. In Elizabeth's great war with Spain England had only borne a comparatively small part, while the Dutch by land and sea had won by their victories most of the advantages. The greatest prize of all, the Spice Islands, fell into their hands. Their sea-power was a constant challenge. Their genius for trade a constant provocation. They became the legitimate successors of the Hanseatic League.

Already they had proved themselves intrepid navigators. The first true Polar expedition was under the command of the Dutch leader William Barents, not to be confused with the Cockney Englishman, William Baffin, who discovered Baffin Bay in 1615. Barents sailed from Amsterdam in 1594 in search of a north-east passage and reached "Farthest North" at 77 degrees. He brought back remarkably accurate observations of the tides and stars. This meticulous observation and care over details is a characteristic of the Dutch genius. All their ventures, and, indeed, their art also, are stamped with methodical precision and untiring industry. Holland is a small country with a small population and is for ever threatened by the invading sea. Only a people of sturdy character and indomitable courage, with the spirit of enterprise and the resource of unfaltering dogged purpose, could have thrown off the mighty yoke of Spain as did the Dutch in the long struggle which ended in the Twelve Years Peace of 1609.

The Rise of the Dutch

The epic story of the rise of their power is graphically told in Motley's *Rise of the Dutch Republic*, and the virtues they applied to war when applied to the arts of peace were irresistible. They built cheap ships and loaded them to the last ton of cargo. Their greed often outran their discretion. In many cases worn out and unseaworthy ships were kept in commission for the sake of snatching profits. These Dutch merchants managed their finances with shrewdness and wisdom. The Government lent money at low interest, and shipowners attracted the best crews by paying good wages. The Dutch built up the most powerful and prosperous business in the East. But the price



THE BOW VIEW OF A TYPICAL DUTCH TWO-DECKER

By courtesy of the Rijksmuseum, Amsterdam of this profit-making was human misery and human lives. Journeys were long and intolerably slow, and the problem of long-distance victualling was still unsolved. The Dutch were naturally fine sailors, but crews were diluted with native labour, which made for indiscipline and increased the already too many risks. All ventures were insurable, and unscrupulous owners sailed 'coffin ships.' Bad as sailing conditions were, these were common to the time, and in no vessels were they worse than in the English Navy or merchantmen. The Dutch did build "long, slight ships," a contemporary writer informs us, and they built them of Baltic timber, for they had got control of the Scandinavian and Baltic supplies.

Pepys's official papers are full of the Admiralty's anxieties about these imports of masts and planking from the Baltic, which they found so difficult to secure because of the Dutch demands. The Dutch borrowed ideas from everybody—from Spanish and English ships—and adapted them to their own needs. The fore-and-aft rig which they made so peculiarly their own was borrowed from English ships. In the British Museum are fifteenth-century prints showing this rig with both gaffs and sprits on English vessels. Above all they knew how to sail them with a minimum of man-power. Always they were preoccupied with questions of economy. Cheap methods of construction, cheap 'overheads,' carrying-capacity not speed, low interest on borrowed capital—by such means they were able to undercut competitors and capture shipping trade.

In the second half of the seventeenth century the Dutch built up a fleet of some twenty thousand vessels with a tonnage nearly double that of England and far in excess of that of any other European country. To protect this fleet of merchantmen they also built a substantial navy, and were the first to study convoying thoroughly and to take adequate and tactically sound measures. The Dutch became the common carriers of Europe, and the capacious holds of their ships were packed with every sort of merchandise, for, by their efficiency and business ability, their sound financial methods, and their reliability as traders and carriers, they feared no rivals in the carrying trade. They developed and practically monopolized the fish industry and made it highly profitable, finding fresh fishing-grounds, and they invented a new method of curing.

When Philip II of Spain closed all the Spanish and Portuguese ports to them the Dutch retaliated by challenging the Portuguese supremacy on the Cape route to India and the Far East, and in answer to the English East India Company they founded in 1602 a powerful Dutch East India Company, holding a charter enabling them to establish colonies, build forts, maintain armed forces, conduct wars, and conclude treaties. In fifty years they had almost dispossessed the Portuguese from the Cape route and had colonized and made themselves supreme in the Far East. This policy of expansion was pursued with the utmost vigour and thoroughness and was darkened all too often by mendacity and ruthless violence. The massacre of the English traders at Amboyna, and the appalling Dutch atrocities committed in an endeavour to keep these Spice Islands exclusively to themselves, shocked and horrified even the seventeenth century.

The Dutch were a blend of Calvinism and materialism—Bible and gun travelled abroad together.

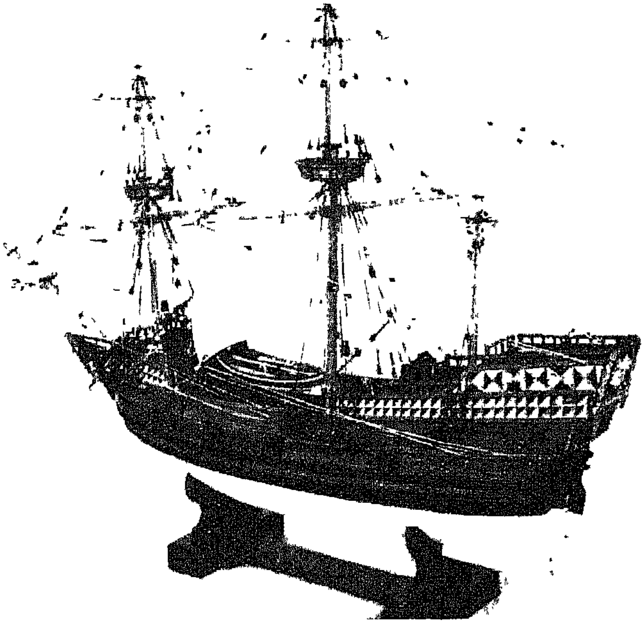
Then they turned to exploration and discovery. Baffled by their unsuccessful efforts to find a north-east passage, they began their search of the southern seas. Probably some hint of land to be found had come to them on their East Indian expeditions. The first positive, recorded landing in Australia was made by Dutchmen in 1606, who went ashore near Cape Keerweer, in the Gulf of Carpentaria, and other Dutch explorers followed. Credit must be given to Governor Anthony Van Diemen, who organized and sent out these and other expeditions. It was Tasman in 1644 who first systematically mapped the western coast of the Australian continent, and in his two voyages discovered the Hawaiian and Fiji Islands, Tasmania—which bears his name—and New Zealand, which he discovered in 1642, making rough charts without realizing it was two islands. But this great southland offered so few rewards to the commercially minded Dutch, who were in search of the wealth and abundance of the Spice Islands—the Moluccas, Amboyna, and Banda—which they already exploited, that they allowed their claims to lapse; thus it was left to the redoubtable Captain Cook to rediscover the Australian continent and to claim it for England. New Holland, as Australia was first named, had been visited by William Dampier, the Somerset buccaneer and freebooter, and in 1699, in command of H.M.S. *Roebuck*, he sailed for Australia. The sloop was unseaworthy and the crew mutinous and down with the scurvy; after a terrible journey, enduring indescribable horrors, and finally losing his ship off the lonely Ascension Island in the South Atlantic, Dampier managed to join an East Indiaman homeward bound, and reported the coast of New Holland as "the barrenest spot in the globe."

By the Stuart aristocrats, who despised their business as bourgeois, the Dutch were contemptuously called the "waggoners of the sea." But the Dutch held their occupation as more than respectable. It was honourable. The burghers of Amsterdam and Rotterdam regarded their possessions with pride, and their dignity was enhanced by their success as merchants. They had seen enough of popinjay strutting—a popular *canard* was that Spanish naval officers wore spurs—and were in revolt at all the hollow pageantries of an effete society. Their values were in craftsmanship and solid comforts. The Dutch enjoyed the century probably more than any other country. They discovered with delight the savour of the good things of the earth with which they were endowed—the sweep of the horizon, the tang of the sea, the colour of a tulip or a lobster, the propriety of a well-ordered household, the joviality of well-fed human beings. They were essentially middle-class in the best sense of that term.

But, though the Calvinist Dutch escaped from the political yoke of Spain, we can still recognize the Spanish influence in their carracks, as we can see it in the stately burgher homes of Amsterdam and in those spacious and dignified interiors that Vermeer and De Hooch loved to paint. Their love of the sea is reflected in the seascapes of Van de Velde and the magnificent portrait of Van Tromp by Rembrandt, to say nothing of those brilliant still-life studies of lobsters and fish served on a dish in every collection of seventeenth-century Dutch paintings.

English and Dutch Rivalry

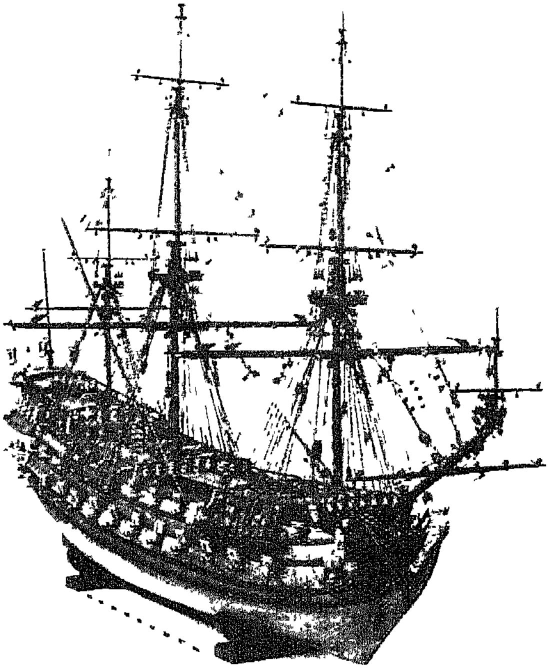
It was obvious that the interests of England and Holland were bound to clash. Though the Dutch were our allies in the war with Spain, and gave asylum to the refugees from the orthodox persecutions of James I, war was inevitable. The Pilgrim Fathers must have felt the growing hostility against the English when they resolved to leave Holland and make a new home in America. The dreadful privations of those religious emigrants, who sailed from Plymouth on their memorable journey across the Atlantic in the *Mayflower* on September 6, 1620, were not only a witness to their sincerity but showed the stuff of which the first American colonists were made—an independent, rigid, and exemplary character that George III and his Ministers failed to understand when they aggravated the War of Independence. The associations of the *Mayflower*, just a typical trader of her time, slab-sided and straight-bowed, give her a unique place in our history. She was apparently ninety feet from stem to stern-post, and 'burthen' was 183 tons. She made the crossing in sixty-seven days. Her timbers may still be seen built into the barn in the Quaker settlement of Jordans, in Buckinghamshire.



THE "MAYFLOWER" (1620)

From a model in the Science Museum, South Kensington. Crown copyright

Though the Dutch artists Van Dyck and Lely practised at the court of Charles I, and though England for a time, like Holland, became a republic, and though both countries professed the Protestant faith, their commercial rivalry, especially in the East, grew more and more intense. It clashed at home with the interests of merchant seamen, who were being squeezed out of business and resulted in the Navigation Acts, especially that of 1660, which prohibited foreign vessels from entering English ports with any products other than their own. The demand by Charles I of £30,000 annually for licences to fish in English territorial waters had been bitterly resented. In 1651 Cromwell passed a Navigation Act which infuriated the Dutch by preventing their trade with the English colonies. Motley records many examples of mutual ill-will. The English Ambassador at The Hague was refused an audience, and when English Naval captains insisted on the absurd demand that Dutch ships should dip their topsails, or, more accurately, let fly their sheets in acknowledgment of England's sovereignty of the seas, this was, in Shakespeare's phrase, "something too much." Admiral Tromp refused.



A MODEL OF A DUTCH MAN-OF-WAR (1665)

By courtesy of R. C. Anderson, Esq., from a photograph in the Science Museum, South Kensington

War was declared. Admiral Tromp sailed up the Channel, captured a number of British prizes, mostly fishing-vessels, and took them to Boulogne. He indicated their being for sale in the traditional manner, by hoisting a broom at the mast-head. It was certainly not hoisted on any of his fighting ships. Blake's whip had existed for centuries as the knight's pennant on shipboard. These facts gave rise to the legend which is a contemptible libel on the worthy and religious Tromp, perpetuated in the one-time popular ballad:

> A broom is the sign for me:
> That wherever I go the world may know
> I sweep the mighty sea.

De Ruyter, to the lasting disgrace of Charles II, inflicted such ignominy on England as to sail up the Medway and to capture Sheerness, while our Navy, unmanned with sailors deserting because they had received no pay, unfitted and without ammunition or stores, lay helpless in Gillingham Reach. What is more, de Ruyter, aided and abetted by our own men, towed sixteen English vessels, including the *Royal Charles*, the finest ship in our fleet, in triumph back to Holland. The story of the three Dutch Wars, the brilliant successes of Blake, the great English admiral, and the final peace, signed on February 9, 1674, in which the English sovereignty of the seas was fully recognized, belongs to the history of naval warfare. The battles between Blake and Tromp were the first in which modern naval tactics were employed. Previously ships had been manœuvred like army regiments or else it was each ship for itself in a series of 'dog fights.' Blake and Tromp fought for position, with ships in single file, aiming to get the 'weather gauge,' or windward, of the enemy, and then attacking with the wind behind them. The fleets sailed in line, and so ships could fire a broadside without endangering each other.

But one of the chief causes of the ultimate Dutch defeat and decline was nature herself. Ships were growing bigger and bigger and were drawing more and more draught of water. England was rich in deep natural harbours, but the waters round the Dutch coasts were shallow, and the sand was continually silting up the anchorages. In vain did the Dutch shipbuilders build flat-bottomed boats, slow and cumbrous in competition with the deeper and cleaner-lined English ships. A sandbank, through which no dredging could keep a fairway, blocked Amsterdam, and not till the construction of the North Sea Ship Canal, just over half a century ago, did this city become accessible to big ships. A similar fate befell Rotterdam, and until an access independent of the natural outlet to the sea became possible the city declined. But the Dutch had played a great part in the drama of shipping. They had combined economy with craftsmanship in shipwrighting, they had adopted and employed a new kind of rigging—the fore-and-aft rig—they had brought a new dignity to the merchant-trader, and they had added a new kind of craft, which was both to be useful in war and also to add tremendously to the delights of peace-time sailing—the yacht.

But they did still more. As democrats they set a fresh and higher value on individual life, and the lot of the common seaman was considerably improved, as it was too during the brief English Commonwealth. Men were treated as human beings, and not, as was the general rule in all the mercantile and royal navies, worse than cattle. The

Dutch were the first to consider seriously the scourge of scurvy; inviting the scientists to explore the problem. They secured ports of call along their Far Eastern trade-routes where they could reprovision, and so stave off the worst effects of this disease.

Conditions at Sea

Scurvy! In the history of every long voyage through the centuries we read, "They suffered from scurvy." Do we ever realize what that means? Those words tell of filthy quarters and verminous clothing, of bad ventilation and stench, of salt beef and salt pork served—or rather thrown—to the men in the galleys for weeks and months till their stomachs heaved at the greasy mess and their tongues were parched and swollen with the maddening thirst it created, of stale water that set up nausea, of rancid fat, of sour beer, of hard biscuit and maggoty cheese, of food monotonous and often putrid, of a diet that included nothing fresh and clean, no fruit, no green vegetables; of lice and bugs and fleas, of rats and every kind of vermin. The disease was due to the lack of green vegetables, and, while not caused by vermin and dirt, such conditions made the dreaded disease still more deadly.

In such living conditions and on such food these men had to live and to work, reefing sails in a gale, hauling at ropes and hawsers till their blistered hands were raw and swollen, ever busy at the halyards, or braces, heaving the old barrel windlass, caulking leaks with oakum and pitch, pulling on the pumps—the endless jobs about the ship—bullied by their officers and with no hope of any redress. Many were landsmen pressed by the gangs into service and unable to cope with their jobs. Is it any wonder that the seamen of these days became brutal and bestial? The unlucky, green hands—a danger to the ship and a curse to the rest of the crew—were unmercifully treated. Is it any wonder that they suffered from feelings so depressed that a cure was to whip them into action to prevent suicides? Who cared? Not infrequently half a crew was incapacitated, and the death-rate ran as high as 30 per cent. Not a man among them could have felt really fit. But they had to go on without any skilled medical attention, and if they collapsed they rotted in a stinking sick-bay, where there was little or no ventilation, till death released them. Poor devils! Yet this deadly and painful disease, scurvy, meekly accepted as a fate, appears all the more terrible when we realize it was avoidable. It yielded almost immediately to a changed diet of green vegetables or fruit-juice. We know the ships had neither refrigerators nor ice-boxes, and they could not carry and keep fresh a supply of vegetables, but enlightened captains with a spark of humanity in them saw to it that they carried lime-juice for their crews.

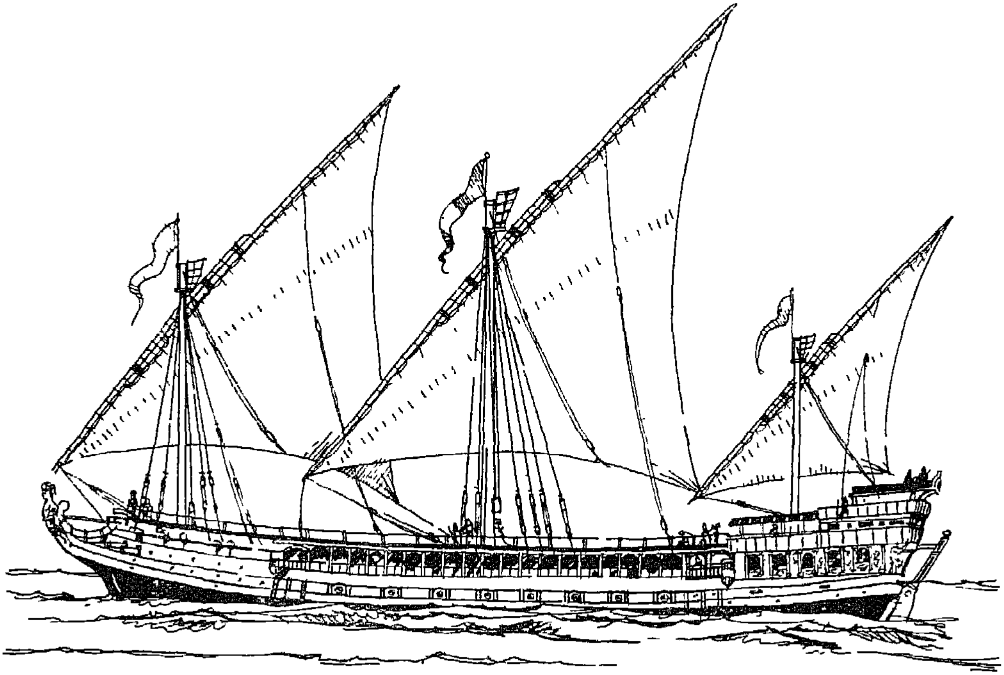
When the first fleet of East Indiamen sailed away from London "Generall of the Fleet" Lancaster included in the provisions of his ship "certaine Bottles of the Juice of Limons which he gave to each one, as long as it would last, three spoonfuls every morning fasting." But how few captains worried about the health of their men! Though they knew of the value of anti-scorbutics, they would not incur either the expense or the trouble to use them. After all, labour could always be impressed into service, by fair means or foul, and as for the crews of merchantmen, what were they but criminals, drunkards, ruffians, and outcasts? So there was no particular missionary zeal to save either their bodies or their souls. It is to the credit of the Dutch that they recruited on to their merchantmen a type of sailor who could be trusted and consulted and that the health of the ship's company was a first consideration of their captains. But not until Nelson's time was it made compulsory to provide anti-scorbutics in the British Navy. Even to this day Americans refer to all Britons, and particularly British sailors, as "Limies." It originates in the fact that, whereas on American ships they had plenty of citrous and other fruit and fresh vegetables, on the British ships they were served out every day with a tot of lime-juice as an anti-scorbutic. The Merchant Shipping Act of 1894 stipulates that lime-juice must be issued to the crew after ten days at sea, to provide the necessary vitamin C to the diet. The Dutch maxim was efficiency first.

By contrast read your Pepys, particularly his diary for 1665, 1666, and 1667, and you will see the meanness, graft, and scandalous misuse of naval stores that went on. The root of the evil was that the Government did not pay its servants more than a pittance, on the understanding that they would reimburse themselves with perquisites. It left the door wide open for all sorts of malpractices. It fell upon Pepys to prepare the Admiralty's defence to the outrageous insult of De Ruyter in the Medway, but, fortified by mulled sack and brandy, "whereby he did find himself in better order as to courage truly," he acquitted himself well, and gleefully recorded with amusing vanity, "All the world within hearing did congratulate me." Nevertheless this pleasure-loving, contented *bon viveur*, this fascinating diarist and Secretary of the Navy Board, was never violently outraged by what he saw of the abuses of the naval contractors or the prevailing conditions in the ships, never stirred to protest nor moved to pity, though he showed himself more of a reformer than most of his contemporaries. But honest Samuel Pepys could do little but complain, "The court is as mad as ever; and the night the Dutch burned our ships the King did sup with my lady Castlemaine . . . and they were all mad hunting a poor moth." He at least was aware of the abuses, noted them, and when the seamen's wives assailed him on his way to his office he jotted down their cry, "This comes of you not paying our husbands." Conditions in the Navy always had been deplorable. They always would be. So he went to the playhouse and forgot the rogueries. The contractors went on cheating, the ship's officers went on accepting bribes from the ship's chandlers, and the men went on starving and sickening on putrid food —and being cheated of their pay as well.

Piracy

Piracy, which in Elizabethan times had been considered an honourable profession, still prospered on the high seas. Charles II knighted that daring buccaneer Henry Morgan on his return from sacking and looting Panama in 1670, and, on the principle of "set a thief to catch a thief," appointed him governor of Jamaica. The New Englanders hired Captain Kidd to hunt out pirates, but he was accused of turning pirate himself in the Indian Ocean. Usually he is described as the blackest villain of all; yet the treasure he was said to have buried somewhere in the Florida Keys—the inspiration of R. L. Stevenson's classic pirate yarn, *Treasure Island*—was never found, and the packed jury dare not even try him for piracy. The careful research of David Hannay in his study of the case of Captain Kidd establishes that Kidd was the victim of a political murder; he was hanged at Execution Dock in 1701.

What grim tales are told of these sea-rovers! There was no "peace beyond the line."



THE GALLEASS "LA ROYALE," SEVENTEENTH CENTURY

English, Dutch, and French adventurers had harried the treasure-fleets from the Isthmus for over two centuries, and for sailors who were unscrupulous enough to combine trading with buccaneering, smuggling, or piracy there was always plunder. Many ended their careers at Execution Dock—Esquemeling, Quelch, Blackbeard, and the rest, picturesque, full-blooded villains nearly all!

If you want to know about these pirates, their ships and flags, or evidence about their practices, read Charles Johnson's *General History of the Robberies and Murders of the Most Notorious Pyrates.* Englishmen seem to have formed the biggest proportion of their crews, roughly one in three; many were volunteers from captured ships, deliberately choosing this career though offered a safe passage home.

What adventures and exciting things the privateers tell of—Woodes Rogers, who rescued Alexander Selkirk (the marooned sailor who inspired Defoe's *Robinson Crusoe*), John Walker, and Shelvocke. And is there a more thrilling tale than the *Voyages and Travels* of Captain Nathaniel Uring, who crammed more adventures into his career than one could suppose could be packed in half a dozen lives and a score of books? His stories of the slave-trade, in which he was engaged, and his descriptions of the log-cutters at Campeachy Bay, confirming Dampier's detailed picture drawn twenty years before, his contempt for 'natives' of every kind, and his bitter reflections on the "baptised beasts" among his crews are typical of his age. Like Drake and the other Elizabethans, he had his share of mutinies and put them down with Elizabethan vigour. In the course of his wanderings he happened to command the ship which brought the first cargo of mahogany to this country, so he may be said to have left us something to remember him by, though his name is generally forgotten.

By the end of the seventeenth century the balance of power in Europe was changing. Cardinal Richelieu, who ruled France when Charles I was King of England, had prophesied that the fall of Spain would mean the rise of France. Both Spain and Holland had now seen their best days, and under Louis XIV France became "la grande nation," leading in her aggressive foreign policy as well as in art and letters. In 1672 Catholic France invaded Protestant Holland. William of Orange, great-grandson of William the Silent, who had saved Holland from Spain, took up arms as the champion of Protestant liberties. Dour, implacable in his hatred of France, unprincipled and feared, this Dutch prince, by war and diplomacy checked French ambitions. By his marriage with Mary he won the English Crown. When he crossed the Channel in the fast, shallow-draught, fine-lined 28-gun Dutch frigate *Briel*, or *Brill*, and landed at Torbay on November 5, 1688, he not only accomplished a "glorious" Revolution without bloodshed, but he reversed the friendly policy of James II towards France. There is a fine bronze commemorative statue of this landing on the harbour front at Brixham. With his accession began the long struggle for supremacy which only ended with the downfall of Napoleon.

CHAPTER V

SOVEREIGN OF THE SEAS: II

(1700 TO 1800)

Century of Contrasts—Shipbuilding Reforms—An East Indiaman—Conditions at Sea—Captain Cook—Progress in Scientific Navigation—Ships at Sea—The Coffee-house and Lloyd's—Rivalry with France—Trafalgar—Prisoner-of-war Models.

> Heartless things
> Are done and said i' the world. . . .
>
> SHELLEY, *Alastor*

> England has saved herself by her own exertions and I hope
> . . . she will save Europe by her example.
>
> WILLIAM PITT THE YOUNGER

IF the seventeenth century is the century of the Spaniards and the Dutch, then the eighteenth century belongs to the English and the French. What a century of contrasts! For England and for France there was the swift expansion east and west, the mutual rivalries in India and America, and the great wars for supremacy. At home we had the artificialities and style of the age of Reynolds, Gainsborough, and Romney, the fashions of Vauxhall Gardens and Ranelagh, and the civilities of Addison and the coffee-house; and we had the Hogarth scenes of drunkenness, debauchery, and destitution. France had its Versailles and its Bastille, and seethed into revolution with its Reign of Terror; and at length forged a great war-machine which, with Napoleon at its head, conquered Europe. It was a century of bribery and corruption, of gambling and South Sea Bubbles, of imperial aggrandizement and plunder, of learned societies and ignorance, refinement and coarseness, splendour and squalor. Speaking of England, Disraeli said it was the century of "the few—the very few."

> The world is too much with us; late and soon,
> Getting and spending, we lay waste our powers.

Reforms in the Building of East Indiamen

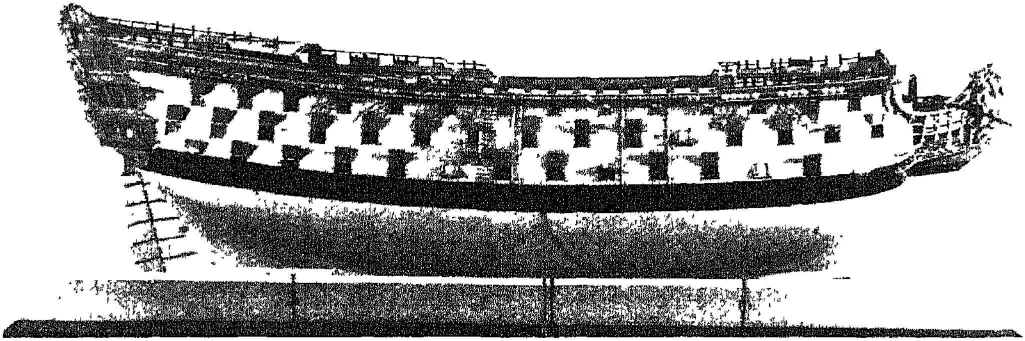
It was the age of the proud East India Company, for through Clive's victories at Arcot in 1751, and Plassey in 1757, the British gained complete political ascendancy in India. Dupleix, who had brilliantly failed to maintain the French power, was recalled home to die in poverty and disgrace. Now the Company had become the ruler over millions, and its servants, drunk with power, in their greedy haste to get rich practised every form of extortion and oppression. Clive firmly checked the corrupt activities of the English 'nabobs,' and only earned such abuse and ingratitude that, broken by disease and reviled by his enemies, he died by his own hand in 1774.

The shipping records of the East India Company date back from 1708, and our knowledge of their ships is much more complete than that we possess of the general run of merchantmen because the records of the Port of London register only reach back to 1786. Early-eighteenth-century East Indiamen ranged between 400 and 500 tons, while a proportion ran as low as 200 tons and under. The Deptford yard had been abandoned, and in the interest of economy the Company had reverted to the practice of buying ships. Discouraged by the early experiences of big ships, for the first seventy years of the century small vessels were favoured. When the East India Company exercised the prerogatives of a major Power the policy was changed, and after 1773 concentration was on big ships. Vessels running up to fifteen hundred tons and more were commissioned, and by the end of the century 750-ton ships were common. These were generally frigate-built, carrying about twenty-two guns on the upper deck and six on the quarter-deck. The convoy system was not fully developed, there was ill-feeling between the Navy and the Company due to a variety of reasons, one of which was the press-gang method of recruiting the Company's men for the Navy; and the Navy itself was too occupied engaging the enemy to spare the ships for convoy. Hence the necessity of the Company's arming its ships so that they could fight their way through the privateers watching for prey.

In nearly every engagement the French were more successful than ourselves, due chiefly to the superior design and armament of their ships. From lists of their captured vessels we learn something of the size of their prizes of East Indiamen. A list of twenty such ships compiled in 1730 does not contain the name of a single one above 495 tons. Great reforms in shipbuilding were introduced in the Navy and later in the merchantmen. Copper bottoms instead of lead were now used for making better speed, and planks were stoved to make them more resistant. More attention was given to the preservation of timber. The East India Company began to build ships in India, where there were great forests of teak. At home the company was in conflict with the Marine Interest —a monopolistic ring of shipbuilders who claimed the 'hereditary bottom' privilege. This meant that the member of the Marine Interest had the right to build the new ship in place of the worn out or wrecked old one he originally built. The Company could not ask for tenders in a competitive market which ensures a certain stimulus to progress, but was obliged to take the ships from the builders who built the new ships on the bottoms of the old. Stagnation in design and exorbitant prices for ships supplied were the corollaries of this monopolistic system, and it continued until 1796.

The Navy introduced many innovations following the capture of Spanish and French ships, which were definitely superior in sailing qualities, and manning for the signing on of hands was strictly regulated by law. The *Royal George*, built in 1746, was the first attempt to introduce a better type, and this tragic ship, which was lost with all hands in the Solent in 1782, rendered great service, especially in the memorable defeat of the French navy off Belle-Île-en-Mer in 1759. She was famous for her size and beauty, and her splendid career captured the imagination of the people. Cowper expressed their tragic loss in his poem, *On the Loss of the Royal George.* But what would Cowper have written had he known the truth! The ship did not capsize at all, but a large part of her bottom fell out through Admiralty neglect. The *Royal George* had a burthen tonnage of 2047 tons. Any structural improvements in the Royal Navy eventually reflected themselves in the merchant ships.

The steadily increasing volume of trade with the East—seventy-six Indiamen made the voyage from London to the East in 1795—not only led to an increase in the size of ships but to a more careful study of the problems of ship-construction. One important advance proposed by Surveyor Snodgrass, of the East India Company, in 1791 was the introduction of iron knees, or brackets, to connect the beams with the side-timbers; another was the use of iron spikes and bolts instead of tree-nails or wooden pegs. These were first used successfully on the teak-built Indiamen. As early as 1777 the first iron boat was built in England, but three-quarters of a century had to elapse before the Admiralty withdrew their objection to iron for shipbuilding. This trade increase also led to the building of the first East Indian Dock, opened in 1806, for all through the eighteenth century the big East Indiamen were obliged to lie far down the Thames and to unload their cargoes into small fore-and-aft-rigged hoys; picturesque little 50-ton boats used by the Company for the purpose.



THE HULL OF A MODEL OF THE "ROYAL GEORGE" (1746)

By courtesy of the Trustees of the National Maritime Museum, Greenwich

Life in an East Indiaman

What was an East Indiaman like about the end of the century, and what crew did she carry? A typical vessel would be about 1000 tons burden, 100 feet long, and 35 feet in the beam. She would carry twenty-four guns and a crew of a hundred men. The officers would be a captain, a couple of mates, a surgeon, a purser, and perhaps one or two 'guinea-pigs,' or midshipmen, and a captain's clerk. The ships were usually two-deckers. Under the poop, and on the level of the quarter-deck, were the round-house in the stern with its row of richly decorated windows, the captain's cabin to starboard, and the 'cuddy' to port. Under the round-house was the great cabin, and on either side of the passage leading from the quarter-deck to the round-house were the officers' cabins. The round-house and great cabin were considered the property of the captain, and he let them off to passengers. A typical charge for a cabin with three hammocks or swinging cots would be £300 for the voyage to India. It must not be forgotten that as all travellers were directly or indirectly connected with the East India Company a fixed schedule of passenger rates was drawn up by the Court of the Company according to rank. These were the best-run merchant ships on the seas.

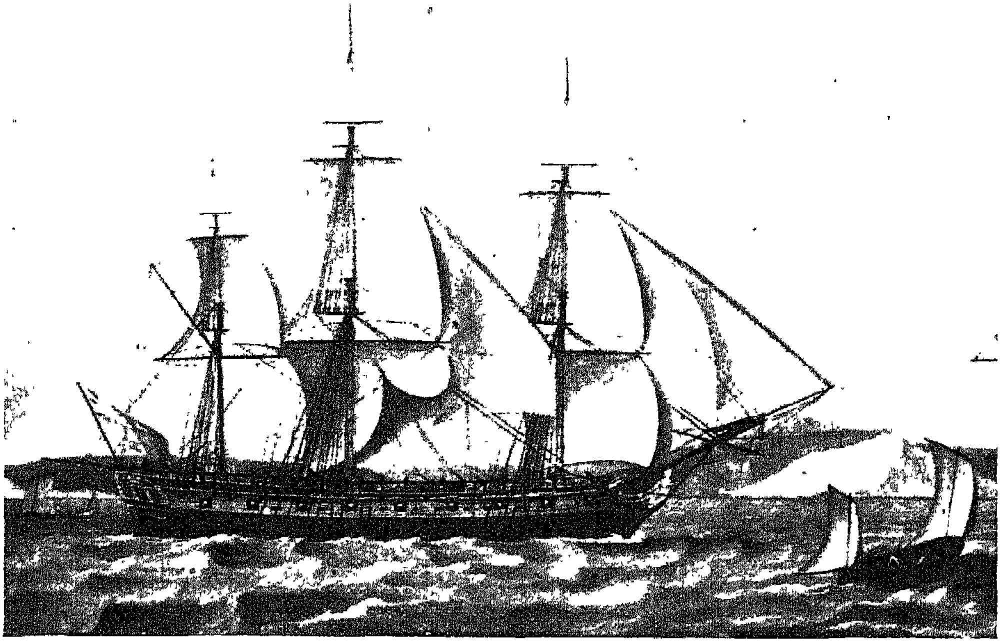
Captains of ships received printed copies of the Company's regulations concerning the general behaviour and tone to be maintained on board, and all passengers received copies calling attention to the need for observing "good manners, known usages and customs." Every Sunday services for "the worship of Almighty God" were held, and everybody was expected to attend. The Captain and his officers were enjoined to "be humane and attentive to the welfare of those under your command." Discipline on board was strict, and there was a slavish observance of the forms, conventions, and etiquette that belonged to polite society. Since the Company held the monopoly of travelling facilities to the East passengers were obliged to conform.

The stratification of society in the eighteenth century was sharply defined, and it was clearly emphasized on the Company's vessels. The poor, in the words of the Tudor Catechism, were instructed to order themselves "lowly and reverently" before their "betters." Who were their betters? People of breeding and substance, a privileged class—"the few—the very few." Religious observance was an exercise not in spiritual values but in propriety. It was against this moral turpitude that the Wesleys crusaded. It would be hard to overestimate the part played in the nineteenth century by the spirit of John Wesley.

> Concerning the Methodist preachers [wrote Sarah, Duchess of Marlborough, to a friend], their doctrines are most repulsive, and strongly tinctured with impertinence and disrespect towards their superiors in perpetually endeavouring to level all ranks and do away with all distinctions. It is monstrous to be told that you have a heart as sinful as the common wretches that crawl on the earth.

For the men before the mast the best conditions were sorry enough. Their whole life aboard was a continual salute. "I'll make every —— sailor on this ship salute a midshipman's jacket, even if it's only pegged on a broomstick to dry," an officer is reputed to have declared. The story is probably apocryphal, but it has its point. The men were disciplined into servility and lived in quarters that were far from cabin-class. Flogging was an everyday event, but then flogging was universal. They flogged in the schools, flogged apprentices, flogged lunatics and criminals, and, as for common seamen, for the smallest breach of discipline flogging was merciless. It is to the credit of the East India Company that, though flogging was practised in their ships, it was used with more moderation than in the Navy.

There is something sadistic in human nature, and an inhuman captain found a pernicious delight in brutality. Do you remember R. H. Dana's description in *Two Years before the Mast* of the captain's dancing about the deck, calling out as he swung the rope, "If you want to know what I flog you for, I'll tell you. It's because I like to do it!—because I like to do it!—it suits me. That's what I do it for!" Every schoolmaster knows how boys grow through this phase and the bully is in every playground. Imagine, then, the behaviour towards the men of the young midshipmen, who had to be saluted with all deference. Think of the tittle-tattle, the aggravations, and the insufferable snobbery; even on these boys' reports men were flogged. The whole sickening business is horrible to contemplate. And think too of the demoralizing effect on the young lads themselves, cut off from all refining influences, spending their adolescent years in an environment of foul speech, drunkenness, gambling, and brutality, precociously aware of every kind of sexual vice. These were the officers of the future.



THE EAST INDIA COMPANY'S PACKET "SWALLOW," 1782
By courtesy of the Science Museum, South Kensington

The officers on the Company's ships were, generally speaking, less guilty of these excesses. They were well paid, enjoying privileges and perquisites that enabled them to retire with more than a competence, and in education and in type superior to the officers in the other sections of the Mercantile Marine. Many were from naval families.

But the East India Company were not philanthropists. For cheap labour they impressed lascars—Indian or Malay sailors—to work on their ships. Ill-fitted to endure the rigours of life at sea, especially in the winter, cooped up in dreadful quarters, cruelly driven by their masters, who had small consideration for these unfortunates, they died in thousands. Often when a ship reached England if a lascar was ill, and so of no further use, he was stranded homeless and friendless, a stranger in a strange land, and left to die of starvation. The Company's Indian rule was one of ruthless oppression.

Yet, as the finest and most comfortable ships of their time, the first express passenger service in the world, they were the pride of the ocean routes. Efficiently manned and maintained, well gunned, and capable of dealing with any pirates—though their maximum armament of twenty-six guns was no match for that carried by the well-equipped French privateers, to which many had to surrender—setting standards both in ships and men at a time when these were lamentably low, the East Indiamen fill a unique place in the history of ships and shipping.

Conditions in the Royal Navy were infinitely worse than in the service of the East India Company, and so deplorable did they become that in March 1797 there were mutinies in the Fleet. The sailors, kidnapped from their homes and forced by press-gangs to serve in the Navy, had many and real complaints. Food and quarters were atrociously bad, liberty to go ashore was rarely granted, pay was scandalously low—fourpence a day—and even this they could not draw. Instead they were given coupons to exchange for goods at one of the dockyard dealers, and so compelled to spend their money as directed, and often cheated by the dealers as well. Punishments were savagely inflicted, and little thought was given to the "common wretches." The mutiny at the Nore led by Parker threatened to blockade London. The Admiralty wisely met some of the demands, suppressed the mutiny by promises of reform—and hanged Parker at the yard-arm of his ship.

Of course, there were praiseworthy exceptions. Nelson, the well beloved, and Lord Howe, the hero of the Glorious First of June—"Black Dick," as he was familiarly called—had no troubles with their men. There were captains who, like Nelson, did without the cat-o'-nine-tails, and happy, well-run ships that got a good proportion of volunteers in their crews whenever they recommissioned. And it should be added that it was the contributions from naval officers out of their small pay that provided for the establishment of the Sailors' Home and Ensign Club, in Dock Street, London. But violence was the keynote of social life. It permeated every grade of society and became, as might be expected, rougher and grimmer as we descended the social scale. Perhaps nothing marks the transition from the eighteenth to the nineteenth century and our own times more clearly than the realization of this coarse brutality.

As for the other punishments—ducking, keel-hauling, walking the plank, and all the other devilish devices that we read of in pirate thrillers—at worst they were irregular and very isolated in their instances, and, at best, they have been exaggerated by the novelists, who persuade us into a sneaking admiration for the ruffians, the gloss of their romance hiding the horrible facts. There is on record only one possible case, and that of doubtful authenticity, of 'walking the plank.' This is not to minimize the crimes against humanity. Even the kindly Dr Johnson protested against the abolition of public executions.

The carrying of surgeons on the King's ships and on all East India merchantmen in the eighteenth century is evidence of the growing interest in the well-being of the crews. Let us give them the credit that is their due, for they got little recognition. They were tolerated among the ship's officers and given a hospital usually in the cockpit in the bowels of the ship—dark, badly ventilated, and cramped. It was, of course, on a battleship the only reasonably safe place for the purpose, being below the waterline. The surgeons had assigned for their assistants the weaklings and wasters of the crew. Their instruments were crude, and little heed was given to sterilization. There were no anæsthetics, nor any of the modern antiseptics. They tackled all the accidents and diseases aboard ship and saw to the cleansing and hair-cutting of the riff-raff from the slums that had either signed on or been seized by the press-gang. They pulled teeth, amputated limbs, and doctored fevers; how they managed to deal with the syphilis, the skin diseases, and all the ills that flesh is heir to, heaven alone knows. The horror of the operating-table and stench of the sick-bay were enough to keep men well, for they dare not be ill. It was a certain cure for malingerers.

The records of the Newgate Calendar in this century show that an alarming proportion of the cases concerned men who had been to sea. It must not be forgotten that many men in these days and in the early nineteenth century went to sea to escape what was due to them for their conduct on land. The crimps supplied 'green hands,' deserters, and fugitives from justice, indifferent to their ignorance of seamanship. Reformative prison treatment had not yet been thought of, and the ferocity of punishment arose out of the desire to make an example of the offender and so provide a deterrent. It is a vicious principle, and when carried beyond the limits of public sanction defeats itself. Proof is to be found in the repressive laws of Pitt, where for small crimes people received such heavy punishments that humanitarian judges and juries preferred not to convict. Right through the history of the sailing-ship we are shocked at the constant use of brute force. In some measure it can be extenuated and explained. No captain could afford to risk the safety of his ship, and lax discipline meant that.

The use of 'green hands' made possible the development of 'bucko' mates and all the scandals of the sailing-ships' fo'c'sle. It was Admiral Duncan's lax discipline that the mutineers at The Nore exploited, not without cause. This is no defence for injustice and exploitation. But a captain at sea with a crew largely drawn from the seaport slums that knows no other language but brute force is necessarily driven to rely upon it. When it is remembered too that often brute force was the only thing the men used themselves, that violence was characteristic of the age and the life, then much can be understood. "The noble art of self defence" was taught in the schoolroom against the risks of unprovoked attack. It would be wrong to give the impression that all sailormen were innocent and all ship's officers, skippers, and mates, were just sheer brutes. The tone of a ship depended on the personality and principles of the men in command.

Where it was informed by a belief that human beings are by nature fairly decent then justice and fair dealing prevailed, and if an offender was meted with punishment it was not only deserved, but the consensus of feeling of all hands on the ship agreed that it was deserved. Where the belief was that men could only be trusted to behave themselves when gagged and handcuffed—in other words, when they were denied any decent qualities—then the ship was filled with discontented and unwilling men. A ship is a community. The solution of its domestic problem rests in shorter hours, higher wages, better living conditions, better education, and more cultured standards. The "common wretches" of the eighteenth century had a long way to travel.

Captain Cook

In his great voyage into the Southern Ocean, however, Captain Cook, a native of Whitby, was a true reformer. Had he not won his place in memory for his discoveries and charting of Australia he would still have deserved all honour for his humanitarianism in an inhuman calling. He made three voyages—*i.e.*, in 1768, 1770, and 1772—all in small ships: H.M.S. *Endeavour* of the first voyage was only 366 tons, *Resolution* and *Adventure* of the second voyage only 462 tons and 330 tons respectively. It was in the *Resolution* he sailed on his last voyage, during which he lost his life. Cook was a great navigator and a great man. He banished scurvy. By insisting on scrupulous cleanliness, by varying the men's diet and reducing their hours of work, he kept his crews healthy. At every opportunity he sent them ashore to collect fresh green-stuff; he served oatmeal, wheatmeal, sweet-wort, and sauerkraut; and he divided the watches into three, instead of the usual two, thus affording rest and recreation.

After more than a thousand days at sea only five out of a whole ship's company of 118 men had to be treated for scurvy, and only one died. Cook could proudly report on his second journey:

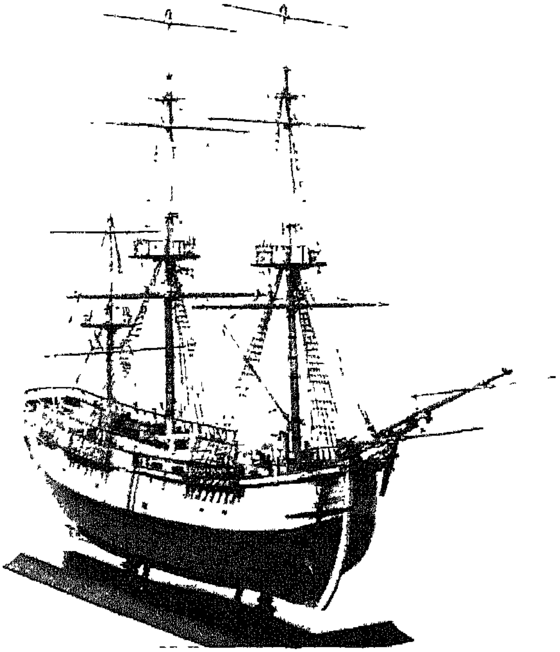
> Our having discovered the possibility of preserving health among a numerous ship's company for such a length of time in such varieties of climate, and amid such continued hardships and fatigues, will make this voyage remarkable in the opinion of every benevolent person, when the disputes about a southern continent shall have ceased to engage the attention and to divide the judgment of philosophers.

What an irony that Australia should become the destination of convict-ships in which all manner of brutalities were practised and in which there was little of that benevolence that belonged to the character of the great discoverer!

Botany Bay, the scene of Cook's first landing in Australia, was planned as the first convict-settlement, but when Captain Phillips arrived with the first convict convoy in 1787 he found it quite impossible through lack of water and sailed on to Sydney. In the early days transportation was a very highly valued privilege, and was carried out with a surprising measure of kindness, considering the age. It was a protest against the brutal laws which provided the death penalty for practically everything and as a rule was only awarded after a strong appeal. Later, of course, it became terrible, mostly through the brutality of the men who administered it, not the system itself.

Progress in Scientific Navigation

The progress in scientific navigation was remarkable. The cross-staff and the astrolabe and Davis's back-staff, used by the medieval and Elizabethan mariners, had long been superseded. The early navigators, when they sailed out of sight of land for longer and longer periods of time, had felt the need for obtaining a 'fix.' It is reputed that the Vikings used the sun to find latitude. They must have had at least a rudimentary knowledge of the sun's movements north and south of the celestial equator, as they lived largely in the "land of the midnight sun." The shadow cast by the boats' gunwale outs the thwarts is said to have given them a measure of the sun's altitude. Magellan and his successors, five centuries later, felt the need for determining longitude, and the Elizabethan navigators Hawkins, Drake, Davis, and the others developed the practice of taking simultaneous observations of two stars.



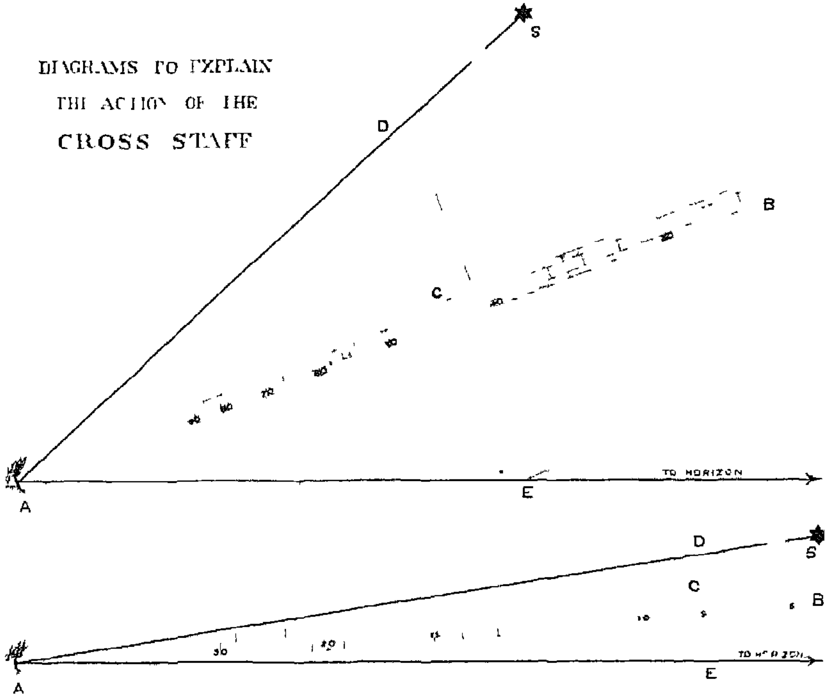
A MODEL OF CAPTAIN COOK'S "ENDEAVOUR BARK" (1768)

By courtesy of C. W. Whitaker, Esq., from a photograph in the Science Museum, South Kensington

The Quadrant

It was this need for accuracy in taking observations that led to the invention by

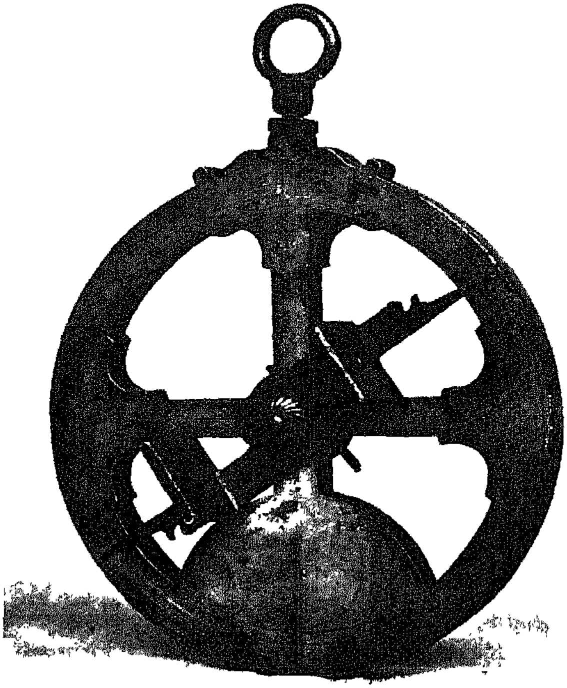
Hadley in 1730 of the quadrant, to which had been added the Vernier scale of Pierre Vernier, previously invented in 1631. This was the first instrument for taking bearings at sea which made use of a reflecting principle. Like the octant and sextant, it is a navigating instrument for measuring angles, the difference being that it is graduated only to one minute, while a sextant is graduated to ten seconds and an octant to fifteen seconds. It contains an arc of 45 degrees, but owing to its double reflection it measures 90 degrees, reading from right to left. It is now a delicate piece of scientific mechanism, but while evolution has, of course, taken place in the accuracy of reading, and in the precision of its making, its form and principle remain unchanged. The sextant has two mirrors, index and horizon, and is an instrument of double reflection; hence the range over which it can be read—that is, up to and over 150 degrees. In recent years an artificial horizon (bubble) and timing-device have been incorporated with it.



A DIAGRAM SHOWING THE USE OF THE CROSS-STAFF

From a photograph in the Science Museum, South Kensington. Crown copyright

Flamsteed, Astronomer Royal in Charles II's reign and contemporary of Newton, devoted a lifetime to rectifying the tables of the heavenly bodies. At his observatory in Greenwich Park, which Wren designed, he laboured at the reform of astronomy for the improvement of navigation and gave to seamen the Prime Meridian. Now almost universally Greenwich meridian is regarded as the one from which longitude is reckoned. This was a period of scientific pursuit, for in this reign the Royal Society got its charter. Newton invented the first reflecting telescope and gave to the world his transcendent work, *Principia*. It was natural that scientists would apply themselves to the problems of navigation, and the urgent one was position-finding. Astronomical research was essential. Flamsteed listed the stars in a nautical almanac, a title still retained. Herschel in 1789 erected his famous telescope, with a tube 40 feet long and a great mirror 40 inches in diameter.



AN ASTROLABE FROM THE WRECK OF A SPANISH ARMADA SHIP

From the original in the Science Museum, South Kensington Crown copyright

Position on the earth is determined by angular distance relative to the equator and the prime meridian. Distance north and south from the equator is termed latitude, distance east and west from the prime meridian longitude. Small circles parallel to the equator, shown on maps and charts by imaginary lines at angular parallels from it, are termed parallels of latitude. Great circles of imaginary lines joining both poles are termed meridians. Where the meridians cut the parallels of latitude the point of intersection identifies the position of the place or object.

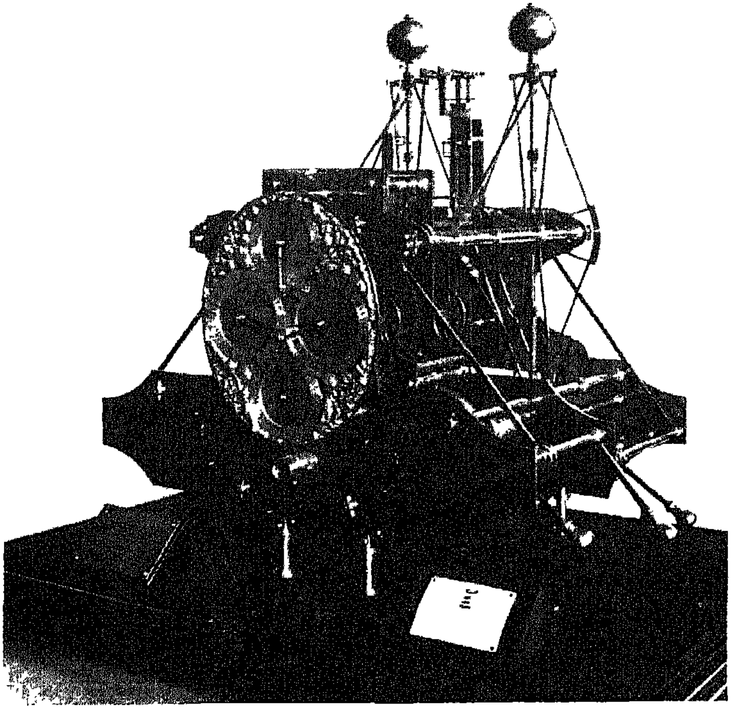
Position may be determined by observation of objects whose position is already known. Such objects may be fixed on the earth or fixed in the sky. When on the earth their direction *or* distance from an observer will provide a position arc or line. When in the sky their direction and angular distance—as measured by the sextant—will provide a position arc or line. Any two position lines, terrestrial or celestial, crossing at a reasonable angle provide a 'fix' for the ship. Radio stations provide a position line in terms of direction—that is, as a bearing. Parallels of latitude and meridians are not, strictly speaking, position lines.

Time is kept according to hour-zones which, of course, depend on longitude. When the altitude of the sun or of a Nautical Almanack star is measured by a sextant the time is noted by chronometer; from these observations its hour-angle can be computed. The hour-angle gives the apparent time at ship. To find the longitude this has to be converted into mean time and then compared with Greenwich mean time. The difference of longitude between two places is equivalent to the difference of the arc of the equator intercepted between their meridians. When the ship's mean time has been compared with the time of the Prime Meridian—that is, Greenwich mean time—and reduced to degrees the longitude is ascertained. Longitude is the difference between a ship's mean time and Greenwich mean time, because time in hours, minutes, and seconds is convertible into degrees, minutes, and seconds.

The Chronometer

It was the necessity to have some form of timing instrument which would maintain a very high standard of correctness for navigation that led the Board of Admiralty to offer a prize of £20,000 for the discovery of a method for determining longitude at sea to within a maximum error of thirty miles. The wreck of Sir Cloudesley Shovel's squadron on the Scilly Isles finally decided the Government to promise such a large reward. A Yorkshire carpenter and mechanician, John Harrison, born near Pontefract, claimed the prize in 1713, but it was not until sixty years later, after the King had personally interposed on his behalf, and when he was too old to enjoy it, that the Commissioners of Longitude agreed to pay the last instalment. It is another story of miserable prevarication and despicable meanness, and of courage and pertinacity in the face of disheartening odds. It was his fourth model that won the prize. Lieutenant-Commander R. T. Gould, who was responsible for unearthing all four models and putting them into working-order, has told the story of Harrison's chronometer in his book, *The Marine Chronometer: its Development*. It was Harrison's experiments in the construction of watches and clocks which resulted in the 'grid-iron' pendulum and the recoil escarpment. More justly and accurately the prize ought to be called a fee, for by his genius and industrious perseverance he earned it, and conferred on navigators a boon beyond price. John Harrison's four chronometers are now to be seen in the Science Museum, South Kensington. Ships to-day can avail themselves of radio, but accuracy in position by radio depends on atmospheric conditions and other factors. Recent researches in radio transmission indicate that the elimination of interferences and the certainty of pure reception in all conditions and over all distances is not far off. Until such perfection is attained radio can only be an aid to navigators and not a *sine qua non.*

In November 1761 H.M.S. *Deptford* sailed from Spithead carrying her Harrison's chronometer. Not before 1825 were chronometers issued as a matter of routine to all his Majesty's ships. The right method of taking bearings was imperfectly understood, and many mistakes were made involving serious consequences. These only served to stiffen the prejudices of the conservative skippers; again the high price of chronometers stopped ready adoption. Nearly a century passed before chronometers came into general use.

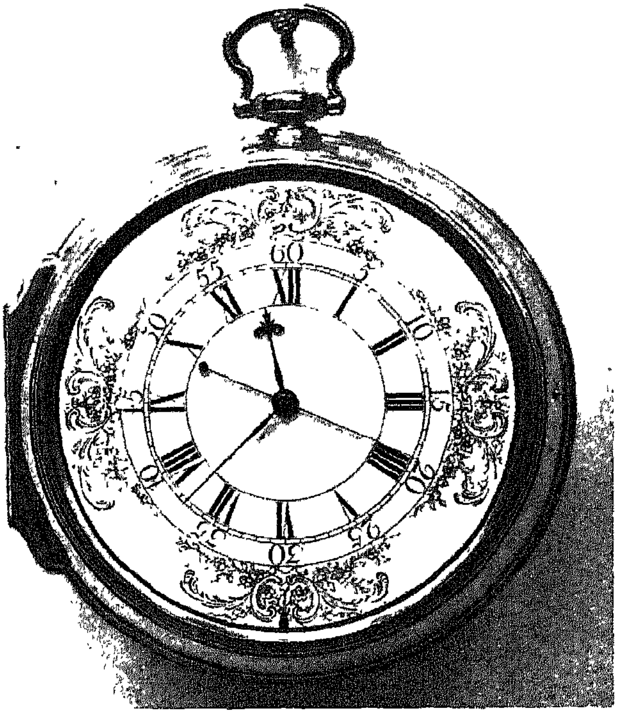


HARRISON'S NO. 1 CHRONOMETER

From the original in the Science Museum, South Kensington. Crown copyright

The Magnetic Compass

The mariner's compass, the instrument used at sea for directing the course of a ship, was still at the end of the eighteenth century very indifferently made, and it was a common practice when a ship was dismantled after a voyage to stow the compasses carelessly away with the rest of the ship's furniture. Known to the Chinese at least two thousand years before, the invention of the compass in Europe is usually ascribed to Flavio Gioja, an Italian from Amalfi, in 1302. The discovery of that quality known as magnetic declination, or variation, was made by Columbus on September 14, 1492. The deflection of the needle from the magnetic meridian, due to external causes, was observed by Wales, the astronomer with Captain Cook in 1772–74. This led to the 'compensated compass,' adjusted to the true magnetic meridian by artificial magnets.



HARRISON'S NO. 4 CHRONOMETER

From the original in the Science Museum, South Kensington. Crown copyright

Many and improved patent compasses, including those of Pope, Dent, Walker, Preston, Gowland, Stebbing, Harris, Scoresby, Duchemin, and Gray, followed, some with and some without magnetic bars. Not until 1876, when Sir William Thomson, afterwards Lord Kelvin, patented his compass, was this instrument sufficiently reliable.

In 1795 the Hydrographic Department of the Admiralty was founded, and a serious survey of the Seven Seas was begun. It is now the largest organization of its kind in the world, providing charts, sailing directions, and all available information on winds, tides, and currents all over the globe. To measure their passage through the water sailing-ships used a sand-glass which measured the seconds taken for a line to run out, the line being marked with knots to show the nautical miles per hour at which a vessel was moving. The equal distances between the knots were determined by simple proportion—*i.e.*, $\frac{\text{feet between knots}}{\text{feet in nautical mile}} = \frac{\text{seconds of sand-glass}}{\text{seconds in one hour}}$. A record of log readings was kept in a book—hence log-book. There are now two sorts of log-book, however, a navigational log and an official log. The term 'knots,' which comes from the sailing-ship days, is used to denote the nautical miles covered by a ship in one hour. To-day rotators are used. A rotator is a propeller-like contrivance fixed to a specially woven line which registers on a revolution counter at the stern of the ship the distance travelled. It functions similarly to a car's speedometer.

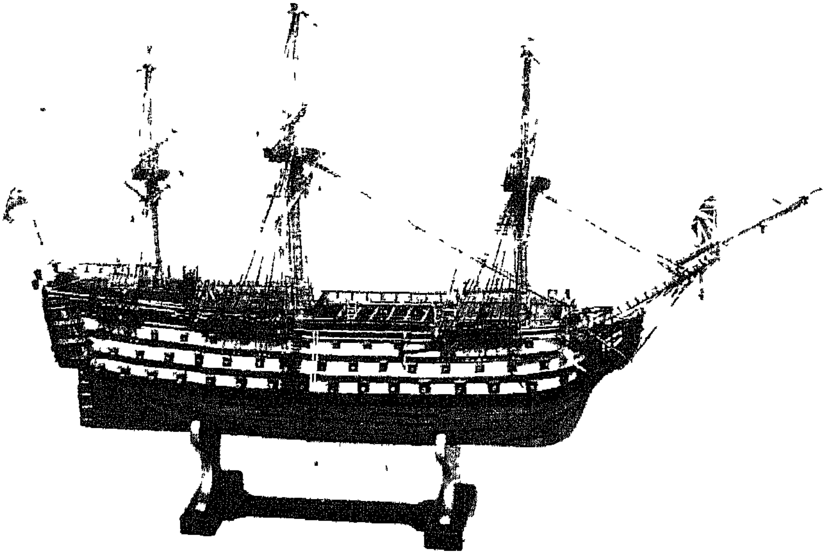
The custom of measuring time at sea, not by hours but by 'bells,' dates from the use of the sand-glass. By this device seamen measured their passage by use of a log timed by a sand-glass. Woodes Rogers refers to time as 'glasses.' It took half an hour for the sand to run through a glass. A ship's boy was put on to turn the glass. As a ship's watch, or turn of duty, was four hours long the glass would be turned eight times. At the end of the first half-hour the bell was sounded once, at the end of an hour twice, and so on. The last watch on a British ship was from 4 P.M. to 8 P.M., and this was divided into two halves called 'dog-watches.' This arrangement avoided the disadvantage of the same set of men being called on to serve two night watches 8 P.M. to 12 P.M. and 4 A.M. to 8 A.M.

There were numberless examples of ships losing their way on the ocean. William Hickey, in his *Memoirs*, records that the ship in which he sailed to India in 1782 found herself 600 miles to the east of her reckoning. Of course, the traverses made in sailing-ships were very different from those of steamers. The winds were the deciding factor, and the methods used for checking position were rough and ready. For the most part they trusted to native sea-sense. Again, merchant ships in the eighteenth century were unable to communicate with one another unless they could get within hailing distance. Hickey records that in April 1770 the *Hampshire* and the *Plassey* Indiamen were in company off Ushant in very bad weather, and Captain Smith, of the *Hampshire*, wanted to compare latitudes. The two ships drew as close as they dare in such high seas, "but the wind roared so loud" that they could not speak to each other. To-day the modern loud-hailer is used. Not till 1804 did Admiral Sir Home Popham prepare a code of flag signals for the East India Company.

"Lloyd's News"

The eighteenth century saw the birth of the coffee-house and the newspaper. The *Spectator* made a mark in English Literature. Lloyd's coffee-house later became the great "Lloyd's," world famous for its marine insurance. It was here the underwriters originally forgathered, and Edward Lloyd, the coffee-house keeper, in 1696 published his first weekly newspaper *Lloyd's News*. It was a single sheet, about foolscap size, printed on both sides and devoted to general news with some shipping intelligence. It was in these early days that the historic auction 'pulpit' now in the famous 'captains room' at the modern Lloyd's was established. Here were sold not only ships cargoes, and shipping material, but all kinds of miscellaneous wares. The first printed marine insurance policy of 1779 has continued almost unaltered to this day

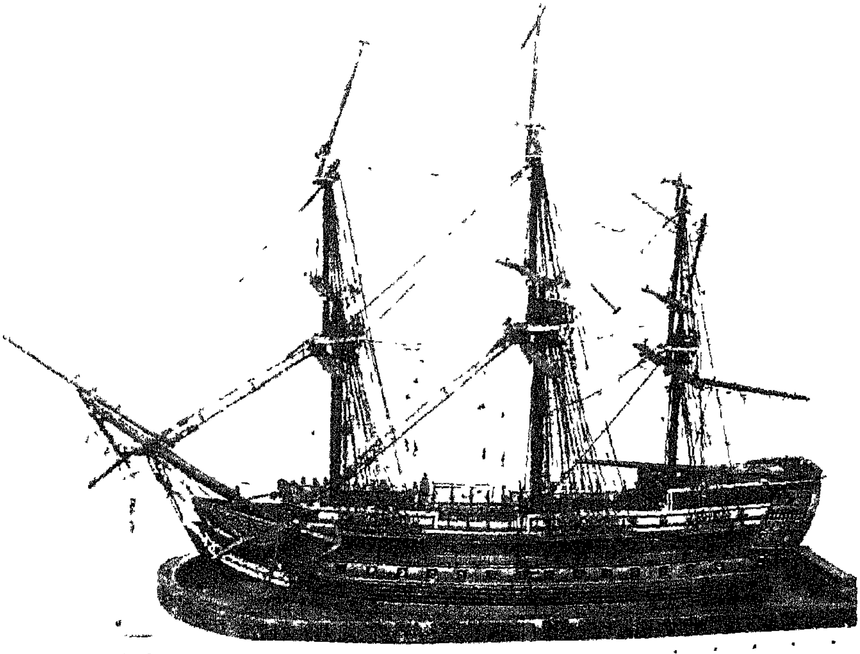
With the expansion of shipping business and in consequence of marine insurance the historic old coffee-house was forsaken for the more palatial accommodation of the



A MODEL OF H.M.S. "VICTORY" (1765)
The model shows the vessel as at Trafalgar (1805)
By courtesy of the Science Museum, South Kensington

Royal Exchange, and the integrity of the underwriters in meeting all liabilities right through the Napoleonic Wars brought business in marine insurance from all over the world. In 1871 when Lloyd's transferred to the new Royal Exchange (the old one had been destroyed by fire in 1838) the registry was granted a charter of incorporation to pursue the business of marine insurance, and forty years later, by the Lloyd's Act of 1911, was empowered to conduct every kind of insurance.

All the early news-sheets gave information of the safe arrival of ships—evidence enough of the interest in shipping affairs—and they sold space for the announcement of sailings and of addresses at which a passage or freight could be booked. The "Jamaica Coffee-house" was a favourite rendezvous for mariners, who did their business over a pony of rum, despising the new drink, coffee—which an enterprising Turkish merchant had introduced—calling it "syrup of old shoes." My lady of fashion was also now entertaining her friends to a "dish of tay." Luxuries only for the rich, as yet, but the luxuries of one age became the necessities of the next, and soon there was to be a new traffic of the sea, a new race for the China tea-crop, a new fleet of ships—the swift-flying



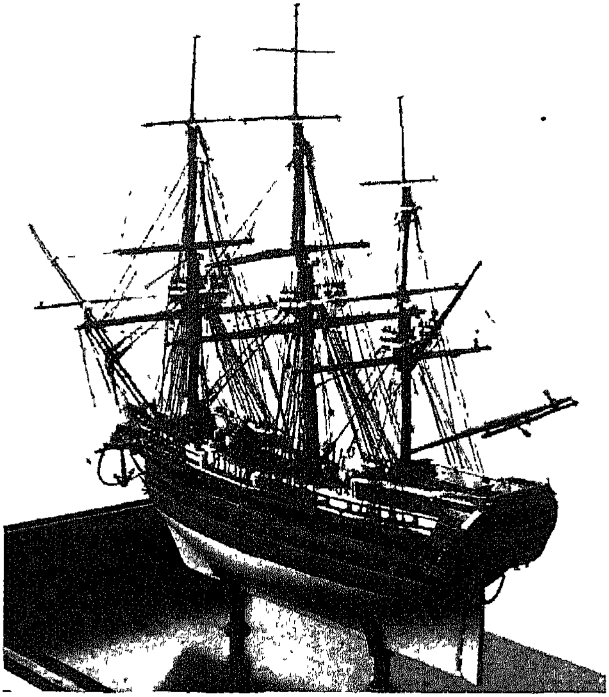
A DAMAGED MODEL OF A FRENCH EIGHTY-GUN SHIP (CIRCA 1800)
This ship was captured from the French and transferred to the English. The model was made by French Prisoners of War
Photo Bassett-Lowke

clippers—to bring to the table, to quote Cowper, "the cups that cheer but not inebriate."

There was Tobias Smollett, once a ship's surgeon's mate in the Navy, writing his novels—a sea-rover with a pen. He created those typical sailormen, Tom Bowling in *Roderick Random*, Hawser Trunnion in *Peregrine Pickle*, and a whole portrait-gallery of figures with the salt sea in their veins. We can picture every hole and corner in H.M.S. *Thunder*, and, in company of tough and rough sailormen, we can drink "bumbo" concocted of rum, sugar, water, and nutmeg. Coarse but virile, salacious but sane, farcical in his caricature, Smollett pierced the hard crust of these salts, and we realize that they were men. He was, in a measure, the forerunner of W. W. Jacobs and his drolleries. And there was Charles Dibdin writing words and music, the "Ocean Bard" whose operettas packed the old London theatres—Drury Lane, Sadler's Wells, and Lyceum—and who gave us that grand old ballad "Tom Bowling."

The End of the Eighteenth Century

Jervis and Howe, Hawke and Rodney, Hood and Nelson—these were the names of the famous admirals who challenged, fought, and finally shattered the naval power of France in the long wars with our rival for sea supremacy. For an account of these stirring times there is nothing finer than the opening act of Thomas Hardy's *Dynasts*, and Southey's account of the battle of Trafalgar is a classic. Now, at last, in title and in fact, England was "Sovereign of the Seas." The *Victory* is more than a historic flagship proudly preserved. She is a symbol, and her deeds have passed into legend. Nelson's famous signal "England expects . . . " before the action of Trafalgar on Monday, October 21, 1805, has become a nation's watchword. In our hours of peril his name is still an inspiration. We have learned to be more just and generous than



THE SAME MODEL AFTER REPAIR BY GERMAN PRISONERS OF WAR IN THE ISLE OF MAN IN 1914–18
(See also the model at p. 117)
Photo Bassett-Lowke

our forefathers, who, ignoring Nelson's last request for Lady Hamilton's welfare, "Take care of poor Emma," abandoned her, and left his maimed and blinded sailors to beg for bread.

The eighteenth century closed in a panic of reactionary measures. Burke died in 1797 crying, "Flee from the French Revolution." In 1794 the Habeas Corpus Act was suspended so that the Government could make arrests and imprison without trial. In 1799 the Combination Laws were passed, forbidding workmen to 'combine' to improve their conditions, and Trade Unions became illegal. The "common wretches" were rendered defenceless, liberty disappeared, freedom of speech was lost, and the armies of Napoleon were assembling at Boulogne for the invasion of England. By Nelson's victories England was saved. It was the poet Keats, who lived through this critical period, who wrote: "There is a budding morrow in midnight."

"There is something indestructibly fine in human nature," wrote Edmund Burke, and while we see it in the courage and endurance of these seamen and in their mutual help in times of trouble, we can see it too in the most unexpected places. These men, condemned to a life of hardship and cut off from all the solicitudes of home-life, brutal and often bestial, could yet feel a sense of awe and reverence in the presence of nature; for they were close to her in storm and calm under tropic suns and arctic skies. They were not insensitive to the beauty of a sunset or the magic of a sunrise. If you doubt that these rough hearts and hands could respond to anything delicate or fine then look at the 'scrimshaw' work done by sailors on whale-ships, those exquisite ship-models in bone and baleen, crude perhaps in their craftsmanship but lovely in their simplicity; or look at the more accomplished 'prisoner-of-war' models fashioned with rare skill out of meat-bones by conscripted war-prisoners, who doubtless had learned the trade of working in bone or ivory.

It is in such little things—such useless things—that hope resides, not in the passions of war or the rivalries of business. It is in the creation of the poetry of living, where the instinct for beauty is nourished so that life shall be worth the living that there is the greatest victory. As Milton, with a poet's wisdom, declared, "Peace hath her victories no less renowned than war."

CHAPTER VI

TALL SHIPS AND THEIR TIMES

(1800 TO 1850)

Portents of the New Century—Abolition of the Slave-trade—Coolie Trade—Rise of Modern Industry—Breakdown and Abolition of Navigation Acts—Inertia in Shipbuilding and Shipping Industry—Spirit of Reform—End of East India Company—The American Challenge—Whaling—Great Lakes Sailing-ships—The American Clipper.

> Yet I doubt not thro' the ages one increasing purpose runs,
> And the thoughts of men are widen'd with the process of the suns.
>
> TENNYSON, *Locksley Hall*

THE inspiring cries of the French Revolution had died away, and only the rattling echo of the tumbrils lived on, paralysing the timid statesmen into reactionary measures. The shouting and the tumult of victory, "Britannia rules the waves," following the overthrow of Napoleon and the final defeat of the French, descended into a wail of disillusionment, discontent, and unrelieved distress, for the men came home from the wars to the miseries of unemployment, hunger, and want. But that great poet Wordsworth, with the vision of youth, knew, despite all, that:

> No star
> Of wildest course but treads back his own steps;
> For the spent hurricane the air provides
> As fierce a successor; the tide retreats
> But to return out of its hiding-place
> In the deep; all things have second birth.

So, though the years from 1815 to 1832 were bleak in the annals of the poor, there were signs for those who could read that in time a new century would bring a more generous humanity. It was, after all, the age of England's triumph, and in 1815 she was the richest nation and the leader in industrial progress. She had a settled Parliamentary Government and was spared from the revolutionary cataclysms of other European nations. She was safe from the fear of invasion and in a strategic position to develop her powers and her wealth. A change of heart from the cynical indifference of the previous century to a more earnest religious attitude showed itself in the growing number of humanitarian reforms. But the century was slow to be born, and only the Cæsarian operation of events freed it from the spirit of the old. As a contemporary poet writes of the aspirations in the Second World War:

> Hope,
> Eager to leap ahead, you do forget
> Events to the slow calendar are tied.

Even in the hopeless opening years the voice of the reformer was heard. John Howard and Elizabeth Fry had begun the case for prison reform, Jeremy Bentham expressed the defects of our English system of jurisprudence and urged the "greatest happiness

The Slave-trade

There was no intended irony in the fact that the first humanitarian reform was in the interests of the African Negroes. Any churchwarden will agree that it is easier to collect funds for foreign missions than for church expenses. The eloquent pleas of Wilberforce led to the suppression in 1807 of the slave-trade, and after 1811 anyone caught carrying on this infamous traffic was treated as a felon and sentenced to life imprisonment in Australia. This measure of emancipation did not pass without opposition. The Member of Parliament for Liverpool, after paying pious lip-service to the noble motives of the promoters of the Bill, admitting that such a trade should never have been allowed to become established, proceeded to defend its perpetuation on the grounds that its abolition would bring ruin to the Liverpool shipowners engaged on the African trade with the West Indies. The foundations of Liverpool's prosperity were laid on the traffic in human cargoes. Bristol grew rich on slaving. The business had grown from Elizabethan days to such proportions that it is estimated that in the year 1760 alone some sixty thousand slaves were transported in British ships from Africa to America, and that between 1783 and 1793 Liverpool slavers carried £15,000,000 worth of Negroes to the West Indies. It was a poor defence to argue that because it had always been so it must always be so, but those who kneel to Mammon can always find prayers. The horrible practice of the throwing overboard by slavers of their human cargoes when chased by English frigates arose from the very faulty wording of the treaties. To secure a conviction against traders in foreign vessels slaves actually had to be on board. Though Englishmen worked on foreign slave-ships and shared in the guilt of these atrocities, there is no recorded case of an English ship throwing slaves overboard—but many Spanish.

Then, following the emancipation of slaves in British colonies in 1834, came the hardly less reprehensible coolie-trade. In 1838 twenty-five thousand coolies from China and India were shipped to the West Indies and South America and forced to work at slave pay. Chinese customs officials and kidnappers worked hand in glove. Many of the Californian clippers, as well as East Indiamen and Blackwall frigates, engaged in the trade. There were appalling atrocities, particularly in the Peruvian-governed Chinea Islands, where the coolies were employed digging guano. The coolie-ships were little better than slavers, and many are the authenticated cases of brutality. It is not surprising that many of these unfortunates committed suicide. Not until 1855 was there any serious attempt to control this Chinese coolie traffic, for other measures that had been passed in the meantime were easily evaded by these unscrupulous coolie traders.

The Industrial Revolution

But what of the slaves at home! Women and little children were set to work in the factories for hours so long as their overseers could keep them awake, and for wages [illegible] at starvation level. Shaftesbury's first Factory Act of 18[illegible] forbade the "young persons" of thirteen to twelve hours a day while the labour of men was unlimited. Even this modest measure of reform met with bitter opposition. The gospel of uncompromising individualism unfettered by social responsibilities has much to answer for. Rousseau, in his *Social Contract*, wrote: "Man is born free, but everywhere he is in chains." The age of metal hammered them on the anvil of competition into handcuffs. The economic slaves in the coal, iron, cotton, woollen, and shipping industries were called 'hands.' When James Watt took out his patents for an efficient and economical steam-engine as a power plant, and with Matthew Boulton established the firm of Boulton and Watt, of Soho, Birmingham, in 1774 he inaugurated a new era.

How fast it grew! We had the coal and the iron, the mechanical genius, and the world for a market. So it grew on the sweated labour of men and women and of little children in the coal galleries and factories. It spawned round the mills, foundries, and docks a fever-stricken wilderness of bricks and mortar, and these arid tenements point their slum fingers to-day, accusing the order which erected them. It is a shameful and humiliating phase of our history which Mr and Mrs Hammond describe in *The Rise of Modern Industry*.

The decay of home industries, the rapid increase of factories in the Midlands and the North, the extension of coal and iron mining, all led to a shifting of the population. The agricultural labourer, with his long hours of work and pittance of wages, was attracted from the soil by the prospects of more money, and as children were an investment, since their small earnings augmented the family purse, there was a large increase in the total population which became concentrated in towns. Between 1801 and 1851 the population in England and Wales increased from 9½ millions to 17¾ millions. Thus we could no longer feed ourselves, and the price of bread rose to famine levels. In 1815 a law had been passed in the interests of the English farmer preventing the import of cheap foreign corn unless the price of English wheat exceeded eighty shillings a quarter, then an enormous price. The result was that corn was so dear that labourers and their families were forced to starve. Cobden and Bright in 1838 founded the Anti-Corn League, and they were supported by the manufacturers in the industrial North in their agitation against the Corn Laws because the lower the price of bread, the lower the wages they need pay. The "hungry forties" forced the Prime Minister, Peel, in face of the most violent opposition from the landed gentry and the farmers, to repeal the Corn Laws in 1846. The import of foodstuffs made fresh demands on shipping.

The imperative need of the factory-owners was for improved means of transport. The first sixty years of the industrial era was the golden age of coaches and canals. But the opening of the first passenger-railway in 1830, which Stephenson had built from Liverpool to Manchester, and over which his famous *Rocket* travelled at thirty miles an hour, brought steam-power to transport. Then followed a railway craze. Capital was attracted to this new steam system of carrying goods and passengers. Railways were built in all directions at the whim of speculators, with no progressive plan. Bogus schemes were floated—there were twelve hundred plans for new railways offered to the public in 1845—and there was a panic investment in railway shares. Many lost their money.

All these activities were bound to affect shipping. In the eighteen-thirties trade and manufacture were developing so rapidly that there was very little unemployment. The markets of the world were hungry for our goods. How was shipping placed to meet these new demands? Had the shipowners been alive to the economic possibilities of expanding trade with the coming of the new industrial order, the growing demand for imports to maintain the increasing population, and the prospects of a settled period of peace?

At the close of the Napoleonic Wars the shipowners found themselves at the end of the war-boom with a surplus of vessels, and until the recovery of Europe, a period occupying ten years, there was a slump in shipping. Instead of following a bold policy of reconstruction and reorganization to take advantage of the inevitable boom which judgment and foresight might have anticipated, the shipowners adopted an attitude of *laissez faire*. Everything was done to cut down expenses. Ships were not reconditioned, and no new building-programmes were embarked on. The ships that sailed were badly provisioned, indifferently maintained, and the men's wages were cut. The lack of initiative and enterprise, in striking contrast with that shown in the manufacturing world and in the development of the country's internal transport system, failed to command capital, which went into the exploitation of the country's internal resources rather than into shipping and overseas trade.

The Navigation Acts

This inertia was primarily due to the paralysing tradition of the Navigation Acts. This long series of acts between 1381 and 1833 were meant to encourage, by the exclusion of foreign competitors, the ships, seamen, and commerce of this country. The two principal Acts were that passed by Cromwell in 1651, and the superseding Act of Charles II in 1660. In the days when there was little foreign trade, and we were mainly a self-supporting nation, these protective measures served a purpose in setting our mercantile fleet on its feet. But by the eighteenth century, when trade overseas was assuming a greater importance, they were a hindrance. By the beginning of the nineteenth century their effects had been so stultifying that they were riddled with exceptions. Foreign countries had retaliated by enacting similar measures. After all, Elizabethan buccaneering was directed against the Spanish Navigation Acts. To iron out the growing tangle of Act and counter-Act, which was strangling sea-borne trade, a whole series of reciprocity treaties were concluded conceding equality of treatment between the signatories. Then too the Navigation Acts were almost reduced to a dead letter in the remote parts of the Empire owing to the difficulty of enforcement. "It is little use affirming a right," wrote Bentham, "if you haven't the proper machinery for enforcing it." The Benthamite Liberals headed by the militant John Stuart Mill were favouring a policy—much to the discomfiture of the Conservative-minded shipowners—involving freedom of trade in money, goods, and labour. The American ships defied the ban in the West Indies, where the planters, though compensated by a grant of £20,000,000 when slave trading was abolished, were still sore, and ready to charter these trespassers with their more speedy brigs and competitive prices. This recriminatory action of the planters resulted in friction and legislative retaliation that strained the relations between Britain and the United States. By 1830 the economic necessities had been faced, and American ships were granted free entry into the ports of any British possession.

The whole system was disintegrating, and the post-Napoleonic War era accelerated the process. The Spanish and Portuguese colonies in South America declared themselves independent republics, and a direct trade with the South American continent followed, which hit the West Indian planters and exporters so hard that as a measure of compensation they were given free choice to charter ships of any country. Many of these Acts were repealed in 1823.

When the Navigation Acts were revised in 1845 it was revealed that more than half the trade was unreserved. Yet the majority of the shipowners still clung to them as an anchor of security. This smug complacency had devastating effects on the shipbuilding industry itself, as well as disclosing an inertia that was out of step with the changing times; for we were passing as a nation out of an agrarian order into an industrial one, which made far greater demands on transport.

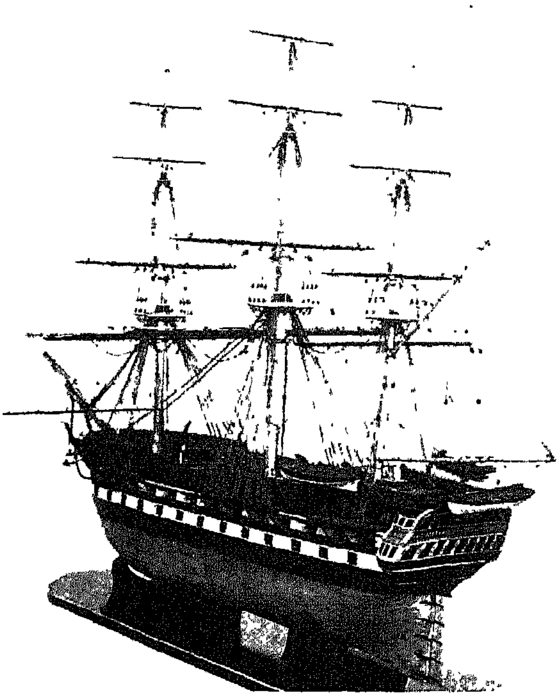
How much progress had there been in naval architecture in the past two centuries? Certainly there had been many innovations and important improvements in the construction and the rig. Labour-saving appliances too had been invented. But if we confine ourselves to essentials, especially in respect of the hull, the progress is almost negligible. After all there was little incentive towards better ship-design while there was little competition.

Stagnation in Ship-design

There is an extensive bibliography on the craft of building wooden ships, and a study of it makes clear that builders were content to pursue the well-tried methods, and there is small evidence of creative originality. The Dumer's draughts of ship-plans for 1680, preserved at Magdalene College, Cambridge, show a method of shipbuilding which does not differ very appreciably from that employed a century later. The standard works on the architecture of the wooden ship were written by Frederick Hendrick Chapman, who became Chief Constructor and Admiral Superintendent of the Swedish Naval Dockyard, at Karlskrona. This great designer, born in 1721, came of an old English family from Deptford, from whom he inherited his skill and enthusiasm for naval architecture. His *Architectura Navalis Mercatoria*, and his *Treatise on Shipbuilding*, an amplification of the former work published in 1775, were freely quoted from in the official report of the Chatham Committee of Naval Architects of 1842–44. There could be no more conclusive evidence than this of the 'mark time' in shipbuilding and ship-design.

Perhaps it can be more picturesquely illustrated by considering, for instance, the four ships used by Captain Cook on his three voyages of discovery between 1768 and

1782—all of them cat-built, similar to Whitby colliers—that is, with bluff quarters and a range of stern windows—and consider, in particular, the *Endeavour Bark*, which was the least altered. She was only 366 tons, built very full in the bilge and very bluff in the bows, which was enhanced by the absence of a figure-head. The cabins, fore and aft, were stepped down as in Elizabethan ships, and she had the same irregular decks. The progress in design of a century had not lifted her very far out of the Elizabethan frame.



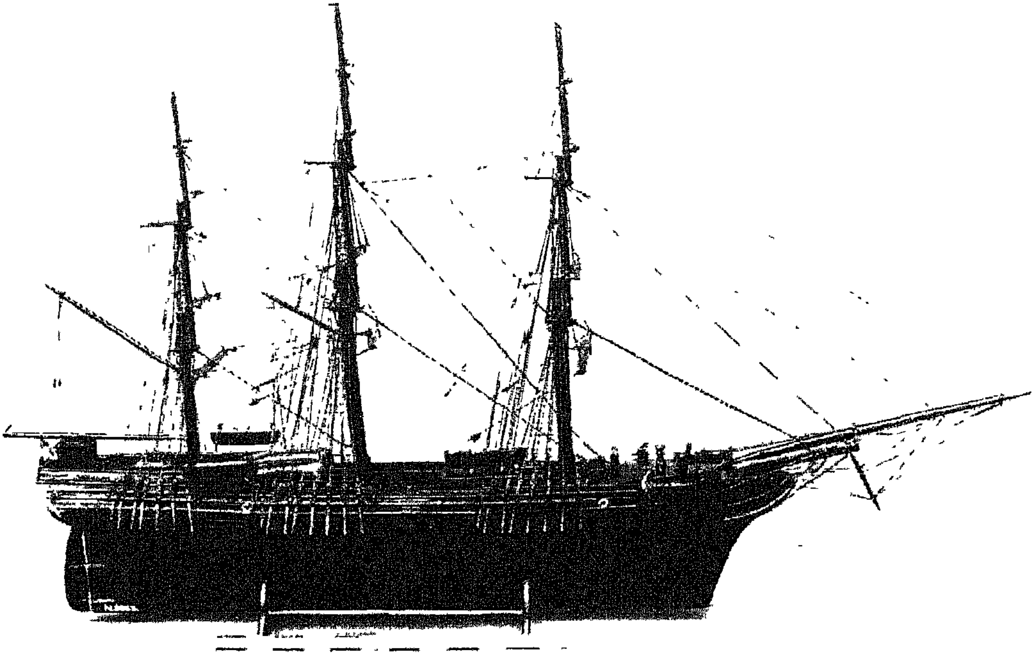
THE "EAST INDIAMAN" (CIRCA 1815)

From a model in the Science Museum, South Kensington. Crown copyright

Splendid work by Surveyor Snodgrass and others gave the East Indiamen their distinction as the best sailing-ships of their time. Most of the improvements were constructional matters, and this is not to minimize their importance in the building of seaworthy vessels. These ships, however, were not typical merchantmen. In all respects, in character, equipment, and men, they were superior to the general run. Nor were they built for competitive trading. These aristocrats of the merchant service, carrying armament for self-protection, covered their own monopolized routes. Though they had many original features, the hull design remains practically static. The galley-built ships of the eighteenth century had their flush decks and speedy movement—Captain

Kidd's *Adventure Galley* was built for pirate-chasing—but their progressive design had no apparent influence on that of merchant ships. The ordinary standard of merchant ships was not creditable. They were slow, unhandy, ill-equipped, and inferior in workmanship. Can one say they reflect two centuries of progress? Ship-design, like a spinning-top, rotated on a point.

The opening of the nineteenth century saw no lively effort to improve ship-design, nor any of that competitive enterprise that marked the race of the factory-owners for business. On the contrary, the parsimonious shipowner's cry was all for cheapness. Like the Bourbons, he had learned nothing and forgotten nothing. Had he not seen the speedy ships built by the American owners and designers before the Declaration of Independence steal past the Spanish *guardacostas* who were trying to exclude them from the Spanish colonial trade? Navigation Acts were not confined to this country. Had he not seen the American blockade-runners during the Napoleonic wars capturing the Mediterranean fruit-trade? Their designers concentrated on fast and handy ships to elude the cruisers on the watch for them. The privateer must find his protection in the speed and efficiency of his ship, and all his thought and energy is focused on



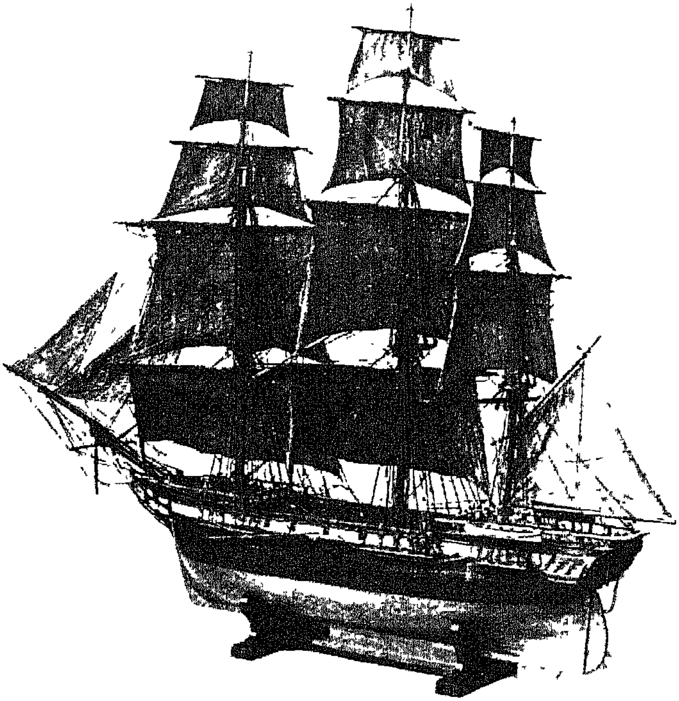
THE SHIP "MERLIN" (1851)

This vessel was built of wood at Saint John, New Brunswick.

From a model in the Science Museum, South Kensington Crown copyright

ship-design to secure these qualities. Speed was a good investment, for it meant not only safety and profit during the war, but in the peace which followed the capacity to make more journeys and so carry more cargo and earn more revenue than a slow ship, besides offering inducements to charterers who wanted speedy transport. To both trader and traveller it made an irresistible appeal.

Incompetence breeds a fear of open competition, and so British shipowners, instead of boldly facing their problem, were trying to evade dues calculated under an obsolete system of burthen tonnage which penalized breadth by building fat-bellied, full-bottomed vessels that would carry more than their registered burthen tonnage. These ships were slow, unwieldy, shoddy in workmanship, and poor in equipment. Had their owners been alive to the great opportunities open to them to develop foreign trade they would never have tolerated these restrictive and obsolete regulations. Their blindness to economic realities mirrors itself not only in the quality of their ships but in the quality of their crews. Officers had no scientific training, were often incompetent, and bullying muscle appeared to be the essential qualification. Excessive drinking, gambling, and the other vices common to seamen, together with a general slackness, were revealed



A BLACKWALL FRIGATE (CIRCA 1850)

From a model in the Science Museum, South Kensington. Crown copyright

as the sorry state of affairs in the mercantile marine by the report of a Royal Commission in 1847.

What inducements were there to attract a better type of man? Yet the East Indiamen enlisted men of a different quality, and the famous Blackwallers, their legitimate heirs on the Far Eastern and Australian services, attracted men of character and education, because their owners took a pride in their ships and an interest in their men. They offered good conditions and good pay and inspired good service. The few enlightened owners did not seek the protection of the Navigation Acts. The majority, however, feared open competition.

The rise of industry created yet another situation. The wealth of the country passed into the hands of the new rich, and moved from the land-owning classes into the pockets of the industrialists, who now sought political power. Hitherto the House of Commons had represented the man of property, the man with a "stake in the country," and only he had the right to vote. As a result of stormy political agitation, which developed a new political consciousness among all the non-franchized classes, rich and poor, in the face of violent opposition, the great Reform Bill of 1832 became law, and the "rotten boroughs" and "pocket boroughs," returning members to Parliament with only a handful of constituents who were bribed to serve the vested interests of the old agrarian order, were abolished. This measure widened the basis of the electorate, and gave the franchise to every borough householder who paid £10 a year in rent. In the counties the rent was £50 to qualify for a vote. The poor were still left voteless and unrepresented, and out of their chagrin and disappointment the Chartist Movement was born.

Change in Commercial Policy

The effects were important. There was a revolutionary change in the commercial policy of the country. The old mercantile system, which had been followed since Tudor times, was challenged, and free trade was openly advocated. The industrial North led the way in this crusade, for these manufacturers had no serious foreign competitors, and cheap transport, cheap raw materials, and cheap labour meant that they could sell cheaply and thus stimulate a big demand. Their interest was in the public as consumer. The bread famine brought the issue to a crisis. The Corn Laws existed in the interests of the landed gentry as producers. The support of the Manchester School for their repeal was not in the main animated by any philanthropic motives but to gain the principle of free imports.

By this time the full consequences of the Industrial Revolution were apparent, but the opposition of the shipowners to any attempts to remove the Navigation Acts was worn down by *force majeure*. Perhaps the most cogent arguments for a changed commercial policy were those advanced by Adam Smith in his *Wealth of Nations*, an epoch-making book, and his work became the text-book of the advocates for the repeal of these protective Acts. "We shall be ruined!" cried the shipowners. "Not so," the former replied, and quoted Adam Smith, "The modern maxims of foreign commerce, by aiming at the impoverishment of all our neighbours, tend to defeat their own ends." For, "as a rich man is likely to be a better customer to the industrious people in his neighbourhood than a poor, so is likewise a rich nation." In spite of the strong opposition of the majority of shipowners the whole of the Navigation Acts applying to foreign trade were repealed in 1849, and those applicable to the coastal trade were removed five years later.

Now there was a steady increase in the import of agricultural produce, and the grain-ships trading with the Black Sea ports assumed importance. With the opening up of the Middle West of the United States and the prairie lands of Canada through the network of railway communications in the seventies and eighties there came such an influx of cheap wheat that the English farmers were ruined. Australian wool was the first colonial product to be shipped in bulk to the factories in the West Riding of Yorkshire, and cotton imports from Egypt, India, and the Southern States of North America fed the looms on the Lancashire 'cotton field.' Liverpool, at the gate of the industrial North, made a spectacular rise as a port, ousting Bristol from second place and rivalling London. Legislation centred on making the industrial and commercial machines function efficiently. The English financial system was reorganized, and the Bank Charter Act of 1826 and 1844 conferred the sole right of the issue of bank-notes on the Bank of England, and regulated its gold reserves, while the Companies Act of 1862 made it easy to found new joint-stock companies and protected investors from fraud.

Since the abolition of the Navigation Acts had left British shipping open to unrestricted competition the accent of legislation no longer concerned with protection was directed towards raising its general efficiency, and in 1850 the Mercantile Marine Act was passed. It increased the powers of the Board of Trade and required definite standards in ship-construction and equipment. Masters and mates were now able to take qualifying certificates of competency. Regulations concerning the discipline of crews, their accommodation, food, and the provision of medical supplies were laid down, and marine boards constituted at the various ports to supervise the administration of its terms. An open scandal of the forties and fifties was the Admiralty's action of selling condemned naval stores in full knowledge that they would be served out to merchant seamen. Board of Trade inspectors passed food unfit for human consumption offered by dishonest contractors as supplies for victualling sailing ships. The Merchant Shipping Act of 1854 still further extended the powers and authority of the Board of Trade, especially with regard to ship-construction and equipment. At last the State accepted responsibility for the social welfare of the men at sea and for the industry's competence to fulfil its duty to the public.

All measures which sanctioned Government interference in industry were stoutly resisted, not because employers were inhuman, but because they were regarded as invasions of English liberty and offences against the ancient principles of English justice. But a new political orientation of mind was now finding expression. The Chartist movement, crying, "Give us not protection but political rights," though it collapsed as a revolutionary effort, had stirred the opinion that the non-franchized still had rights.

One consequence was the abolition of the iniquitous Combination Laws in 1824, enabling workmen to organize Trade Unions.

No small measure of credit was due to Dr Arnold, the famous headmaster of Rugby in the thirties, whose regime transformed English public-school life by its insistence on integrity of character and practical Christianity, and he was a powerful force in shaping the outlook of the governing classes. The social writers too, by their moving exposures, helped to wake the national consciousness. It was left to them to create a public opinion more sympathetic to the oppressed—to Ebenezer Elliot, whose muse cried for cheap bread, to Kingsley, who wrote humanitarian tracts in the guise of novels, to Charles Reade, who pointed the hard way of the sailor, to Elizabeth Barrett's "Cry of the Children," to Tom Hood on the despairing unfortunate, and to Charles Dickens—especially Charles Dickens.

Humanitarian Reforms

Much was done to mitigate the savagery of the late century. In 1832 sheep-stealing and forgery were no longer visited with the death penalty. Hanging in chains was abolished in 1834; the pillory, the stocks, the ducking stool, symbols of a brutal age, vanished shortly afterwards. In 1841 capital punishment was reserved for murder only. The new Gaol Acts of 1844 transformed the conditions of prisons. Conceptions of punishment began to show a glimmering sense that its infliction should not be vindictive but preventive. The Naval Discipline Act of 1847, which did something to reduce the excessive punishments in the Royal Navy, tardily reflected the changing attitude, though it was not until 1879 that flogging was abolished.

It was in the spirit of the times that a Royal Commission of enquiry should be set up in 1847 to investigate conditions at sea. Though the Mercantile Marine Act and the Merchant Shipping Act permitted conditions which by contemporary standards would be considered intolerable, the significant thing is that something was done. Conditions afloat have been deplorable until recent times, and they are by no means ideal to-day. Overcrowding, poor food, low wages, and harsh discipline were all accepted in the nature of the calling. Outside the captain's medicine chest there was little or no provision against sickness or disease, and in the early years of the nineteenth century the mortality from scurvy remained disgracefully high. In the old English sailing-ships no fires were allowed in the fo'c'sle, and crews were not allowed to dry their clothes in the cook's galley. A sailor got no soft bread, no butter, no milk, and no vegetables, and it was not compulsory to carry anti-scorbutics. The old-fashioned biscuits went by the name of "Liverpool pantiles," and were so hard that a man with poor teeth could not eat them. There was not even a table to eat from, and the old custom of spooning out of a common hot-pot, a constant source of quarrels, still prevailed. Not till 1894 was an Act passed introducing butter, milk, soft-bread, canned vegetables, and potatoes into the dietary of the men. To this "grandmotherly" legislation the shipowners offered the strongest opposition. Even bishops held up a warning finger at the growing softness of the lower classes, correspondents in *The Times* wondered what we were coming to, and purple-faced retired naval officers stuttered their disgust at such milk-sop legislation. But its acceptance by Parliament marked a stage in the growth of the national spirit. It is now no longer easy and natural to look on at injustice or suffering without interference, and it is also recognized that it is perfectly legitimate and necessary to curb freedom and independence if these involve injustice to others.

The End of the East India Company

All these measures, together with the stimulating effects of competition, resulted in a revival of efficiency. The old apathy of *laissez-faire* had now gone, and initiative and enterprise took its place. The stately East Indiamen had seen their best days. When the Indian monopolies ceased in 1814, and their Chinese monopolies in 1834, the Honourable East India Company ceased to be a trading concern and merely administered its dominions. When the Indian Mutiny was finally suppressed in 1858 after two centuries of existence the Company came to an end. A great history indeed, and deserving the tribute of Adam Smith in his *Wealth of Nations*:

> The servants of the East India Company . . . in war and negotiation . . . have upon several occasions conducted themselves with a resolution and decisive wisdom which would have done honour to the senate of Rome.

They had illuminated the pages of shipping with a great and worthy record. But they represented a dying order—an order of privilege and security, of power and wealth endowed not by virtue of initiative and enterprise stirred by keen competition but by the status of an Honourable Company with the prizes of the earth as its monopoly. Its doom had been sounded in the cry of the French Revolution and in the founding of the American Republic. However humane and just its direction the times were "out of joint" for an empire to be ruled for the benefit of shareholders. As Burke and Macaulay had pointed out in the Trial of Warren Hastings, it had become a trust. Nearly a century has elapsed since the Company was dissolved. India in a century has come to political maturity, and British rule draws to its close.

It was the Blackwall frigates—fine vessels finely run—that carried forward the traditions and covered some of the trade-routes of the Honourable East India Company. And in the bleak days when English shipping had fallen to such a low ebb of inefficiency they set an enviable standard. Soundly constructed, well equipped, seaworthy, and good sailers—some speedy—they were well manned with officers of ability and character, trained in the owner's own vessels, and with crews whose welfare was not neglected.

American Competition

But the Americans, who had been the first to realize the advantages of speed both in war and peace and whose designers had concentrated on the building of fast, handy vessels, were formidable competitors. The years that the locusts had eaten, while British shipowners were content to make money in the reserved trades still left to them, and equally content with the inferior ships they sailed, had been the younger nations' opportunity.

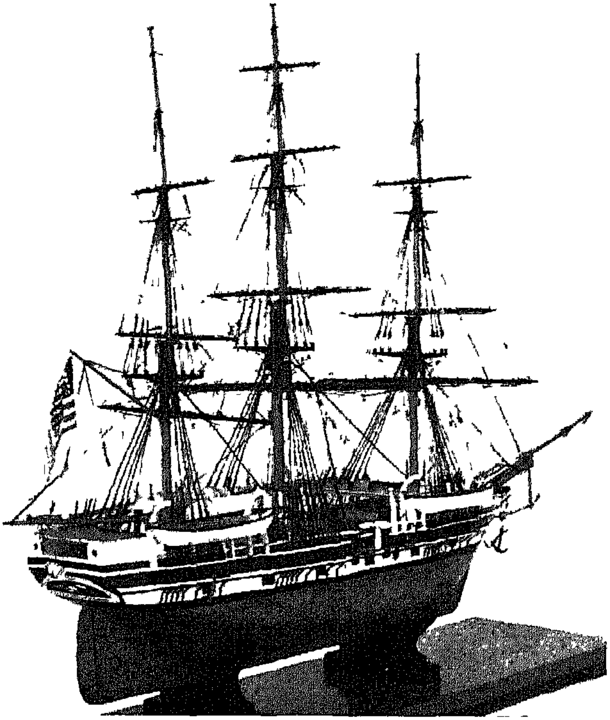
In the Black Ball Line I served my time
To me hoodah! To me hoodah!
In the Black Ball Line I served my time
To me hoodah! hoodah day!

The old shanty reminds us of that famous line of packets, the "Black Ballers," which in 1816 began a fortnightly service between New York and London. The whole transatlantic mail and passenger service fell into American hands. A steady migration of emigrants from war-exhausted Europe was sailing from London, Liverpool, and Havre, to the new land of opportunity over the seas, and because of the ineptitude of the British shipowners the American monopoly went virtually unchallenged. At the close of the Napoleonic wars British shipowners had by far the greatest tonnage on the seas and were in a commanding position had they exerted themselves. These young American builders—particularly in Maryland with their small, speedy Baltimore Clippers, so favoured by smugglers into Spanish lands—broke with tradition and convention. They pulled out the length, they abandoned the square stern, they sharpened the lines, they lifted the masts. They built cheaply, using soft woods which were available, instead of the costly oak and teak, far better for the purpose but not to be had, and they laid the foundations for the most daring and most dazzling Californian gold-boom clippers to be built forty years later in New England. They were restless in experiment, and fought against odds to get in on the shipping lanes. They had the stimulus too of hatred of the British, a heritage of the War of Independence, which blazed up again in the ill-tempered sea-skirmishers during the war of 1812, where the American frigates showed their superior turn of speed obtained by their enormous sail-spread. The American frigate *Constitution* got away from a whole British squadron after being chased for three days. Speed is one of the new characteristic notes of the century. The wheels in the factories were humming faster and faster. The railway was coming to make travel and transport faster. The Americans were the first to recognize that travel and transport by sea must be faster. While British tonnage remained stationary, the American from a negligible figure grew so fast that by 1860 it equalled nearly half the British tonnage—a meteoric rise. The suicidal American Civil War of 1861–65 destroyed so much of the American tonnage that the American shipping menace was ended. And as in Britain capital was attracted to the more profitable investments in industry and railway-construction while shipping was moribund, so thirty years later the same neglect of American shipping happened because the opening up of the vast resources of the continent and the construction of American railroads made a bigger appeal to investors.

In the history of the relations between the "Thirteen Colonies," that eventually formed the nucleus of the United States, and the Mother Country three whalers—the *Beaver*, *Dartmouth*, and *Eleanor*—played a dramatic part in precipitating the American War of Independence, for after delivering their cargoes of whale oil in London they loaded tea at the East India Dock for Boston. The Boston Tea Party, where the tea was pitched overboard, shows what respect the outraged colonists had both for the English Government and the East India Company. The year 1772 opened a conflict that was to continue in nominally peaceful conditions until the war was won.

The Early Whalers

Wherever British interest could be reached the Americans were there. They made a determined attempt to capture the whaling industry, which was mainly in the hands of Scottish whalers. The British Government could not look on unconcerned. British shipowners fitted out a fleet of some hundred and fifty vessels sailing from Peterhead, Aberdeen, Hull, Grimsby, Leith, and Dundee, to the Arctic and the Antarctic, availing themselves of the Government subsidy—which had been granted long before to encourage this business—in an attempt to break the American competition from New Bedford, Nantucket, and New London in the United States. The subsidy was withdrawn in 1824. The business of whaling, which has a history reaching back to the seventeenth century, reaches its competitive climax in the first half of the nineteenth century when



A MODEL OF THE WHALING SHIP "ALICE MANDELL" (1851)

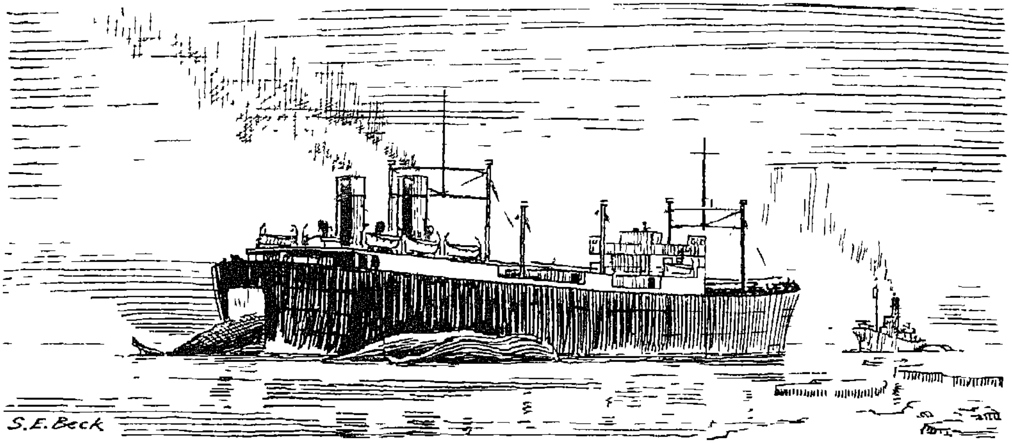
By courtesy of Mr F. L. Higginson, Connecticut, U.S.A. From a photograph in the Science Museum, South Kensington

American competition was keenest. The Scottish ports specialized in Arctic whaling, building suitable vessels and training whalers, and they were hardest hit.

Speed was not the essence of a whaler, but strength and solidity; sail craft was less important than boat craft, for though these whaling-men would have been 'at sea,' in a double sense, on a fast-sailing ship, they were superb in an open boat. The whale-man's song, "A dead whale or a stove boat," tells its own story. The whale-ship was stout and slow, blunt in the bows and square in the stern, and for size was counted a big ship, though by no means comparable to an East Indiaman. She had no rake to her three masts, her deck was flush, and she carried little sail. Every inch of her space was designed for carrying. In an American whaler the ship's food-stores were packed in casks, which when empty could be filled with oil. Her bulwarks were fitted with heavy wooden davits for lowering the whale-boats, and the boats were carried under them; indeed, she seemed full of boats, for these were stowed in every odd corner of the ship. Up aloft on the mast-heads was the crow's-nest, an open platform, not a steel cabin with a telephone as on a modern whaler, but a perch just big enough for the look-out man to stand on while watching for sight of a whale, and a ring of iron, through which he squeezed his body and on which he could rest his arms, as his only security. In many whaling centres a barrel was used. Perilously he stood, like a figure on a monument, gazing over the seas till his watch was done. The whaler carried usually a crew of forty or fifty men, including the ship-master, surgeon, carpenters, and coopers; though of course the crew of the ship depended on its size, and whalers had a wide range. It was a dangerous calling, and their crews included 'hoodlums' without experience, supplied by unscrupulous crimps, who often found themselves at the end of a long cruise in debt to the ship. There are many records of ships being sunk by fighting whales. Melville's *Pequod* has been lost again and again in fact. The tale of the *Essex* lost in the South Pacific in 1819 is one of the most terrible of all—of men a thousand miles from land, of appalling sufferings from hunger and thirst, of cannibalism among the mad crew, and, at last, rescue for the remaining few.

By 1885 the United States were sending over 700 ships, and it was a rare event for any of them to return before they had completed five years' service. The ship was snugged down at night, and, with the upper sails furled, most of the men were allowed to sleep; for they did not keep the watches observed in other ships. Their pay was not fixed, but they took a share in the ship's earnings, except the unfortunate 'green hands.' Bullen, in *The Cruise of the Cachalot*, says he received a two-hundredth lay or share, which means that he could claim the value of one barrel in every two hundred—at 20 dollars a barrel, the usual figure, it meant £4 per barrel—not a fabulous reward for such perilous work. Piece-rate earnings made for efficiency. If you want an informative, descriptive, and first-hand, objective picture of life among these old-time whalers read *The Real Story of the Whaler*, by A. H. Verrill.

If you want a subjective study of the loneliness, the mystery, the peril, the monotony, the humours, and the horrors of life on a whaler in these white solitudes read that document of human passion *Moby Dick*, by Herman Melville, perhaps the greatest, even though so undisciplined, of American writers. Read of the fight between Captain Ahab and the White Whale—a parable of eternal strife; flesh against spirit, the devil against the angel, a whale against a man. There is nothing more elemental, more dramatic, more terrific, in literature than this hatred of Captain Ahab for the whale. The antagonism between them, with all its maniacal fanaticism, is all the more agonizing because there can be no victory for either; without each other, and the hatred and will to conquer that they breed, both would die. It is an epic that pierces to the heart of man and reveals it naked against the wind and the night and the storm. The genius of its author blazes through this great novel.



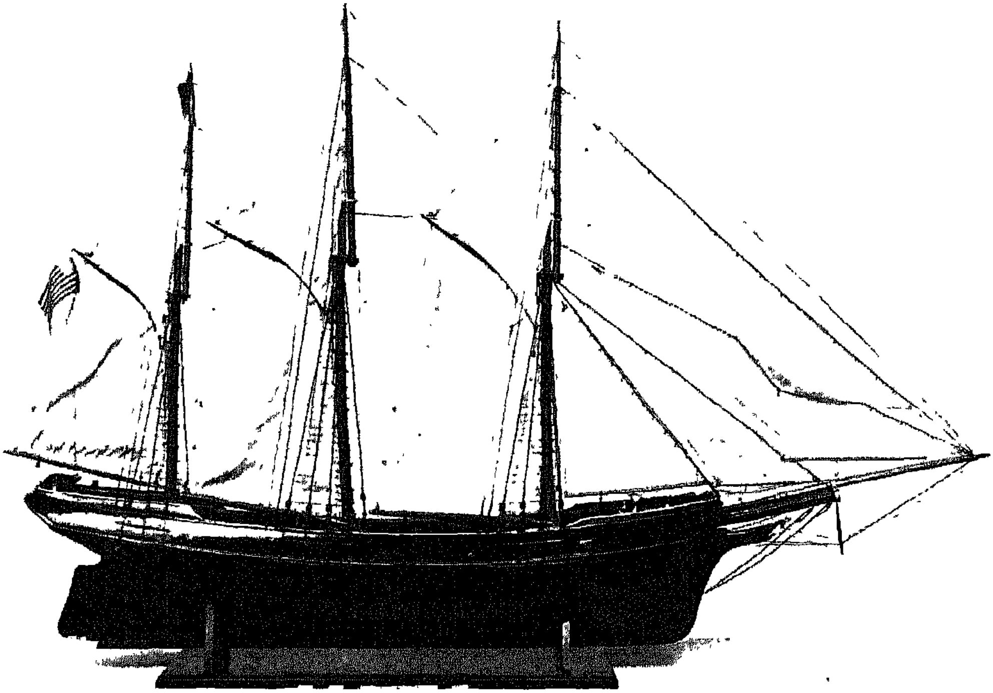
A Whale-factory Ship

This vessel has a slipway and gear for hauling whales on board and machinery for dealing with the carcass.

The modern whaler is an open-sea factory of immense carrying capacity, and modern scientific methods have removed the sporting chance of the *Cachalot*. The *Kosmos*, launched from a British yard in 1929, has a 32,000-ton displacement, the *Tafelberg* has a carrying capacity of over 16,000 tons, and the *Nielsen Alonso* of over 17,000 tons. Indeed, so efficient has whaling become in its destructive power that protective measures have now been taken against the whale's extinction. The need for whale oil as a source of fats during the war and in the present lean post-war period is of first importance. Whaling-fleets have suffered very heavy losses. No fewer than eleven out of thirteen factory-ships were sunk. The whaling-fleets are now being restored and it is expected that a big British whaling-fleet will be able to sail to the Antarctic for the 1946–47 season.

Ships on the Great Lakes

There was still another sphere of competition. In 1812 the United States made a bid for the control of the supply-lines across the Great Lakes of North America. By the middle of the eighteenth century the fringes of the Great Lakes were definitely either in French or British hands, and a distinct type of trading-vessel developed—a two-masted schooner, carrying a big square topsail on the fore, very much in the manner of the topsail schooners then commonly used in the New England coastwise and West Indian trades. Often the big foresail was surmounted by a triangular *rafee* topsail, a revival of the ancient Roman practice, which gave good service under Lake conditions. About the same time the *Oswego* and *Ontario* were built. These two sloops were almost exact replicas of the sloops then in common use in the Royal Navy, except for their lighter draught, and they were the first British Lake vessels ever built. The lack of material, which had to be shipped from England, together with the hostility of the Indians, crippled shipbuilding efforts. Shortly after the war which fixed the international boundary between Canada and the United States steam made its appearance on the Great Lakes. This was the *Frontenac* built at Kingston, Ontario, in 1816, which still carried the rig of a three-masted schooner, though her auxiliary engines came from Boulton and Watt in England, and almost simultaneously was launched the first American Lake steamer, the *Ontario.*



A RIGGED MODEL OF THE THREE-MASTED SCHOONER "E. W. MORRISON"

This vessel was built for service on the Great Lakes and was fitted with fore-and-aft rig particularly suitable for the variable winds of coasting work.

From a model in the Science Museum, South Kensington. Crown copyright

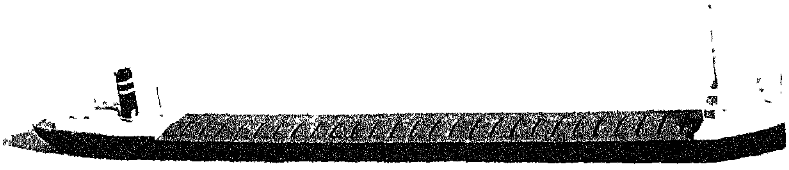
These ships on the Great Lakes were influenced in their design by the peculiar difficulties of the waters they had to sail. Tortuous channels, shallow reaches, sudden squalls, and steeply rising seas of great weight are characteristic features of these inland waters, which, in their extent, occupy the greatest body of fresh water on the earth. The uppermost and largest of the great lakes of North America is Lake Superior which is 412 miles long and 165 miles at its greatest breadth, occupying an area as big as Ireland. Of the history of these ships from the first sailing-vessels we have only a fragmentary knowledge, but most of what we know we owe to the researches of the well-known Canadian marine artist Mr George Cuthbertson. In his book *Freshwater*, which he also illustrated, he traces the development of the Great Lakes sailing-ships back to the pioneer efforts of the Sieur de la Salle who did so much to establish the French in Canada during the seventeenth century. These first sailers ran about 10 to 20 tons and were single-masted like the modern cutter. There is more precise information about the *Griffin*, which is generally considered to be the first European ship built on the shores of the Great Lakes. The hull of this 60-ton vessel, which was launched on Lake Erie in 1679, was modelled on that of a Dutch galliot—a ship particularly designed for the Zuyder Zee, whose shallow waters and vagaries of wind presented similar conditions, though she was rigged like a French brig. The prevailing hostility between the French and the English during the eighteenth century led to the building of vessels which could be used for the double purpose of cargo-carriers or naval vessels, and these sloops were built without reference to local traditions, being almost identical with those built in English yards. This fleet of ships was far from satisfactory, for apart from deficiencies in design the ships were constructed of unseasoned timber. Manned by half-pay officers in the British Fleet and merchant seamen attracted by the higher rates of pay, they saw service through the War of Independence and the war of 1812–14.

It was, however, the passing of the Inland Navigation Act of 1788 to encourage Canadian merchant shipping on the Great Lakes which marks the birth of shipping enterprise on these inland seas. Small sloops and luggers, built by local craftsmen, engaged in trade with Indians in the creeks and many too in surreptitious smuggling. At the opening of the nineteenth century the Americans were running fast-sailing schooners chiefly on Lake Ontario ranging from 50 to 100 tons. The cutting of the Sault Sainte Marie canal, between Lakes Superior and Huron, avoided the tedious portage between the lakes and opened the flow to shipping. Though sailing-vessels increased in size, they were fighting a steadily losing battle for the number of steamers multiplied. Still almost to the end of the century freight-hauling sail maintained its superiority. Freight was carried in 300-ton schooners fitted with a peculiar Great Lakes rig, developed to permit quick gybing in squally winds and narrow waters. There were giants of the inland seas like the 777-ton schooner *Moonlight*, known as "Queen of the Lakes" for her almost legendary speed, and the five-masted barquentine *David Dows*, built in 1881, at Toledo, Ohio, measuring 1481 tons. This freight-hauling passed mainly into the hands of the New Yorkers, and those from what are now the Middle Western States, but gradually, with the increase of steamships, it fell into British hands.

By 1900 all the important trade had left the sailing-vessels, and while to-day there are still many sailing-schooners on the Lakes, they are nearly all fitted with auxiliary Diesel engines. On this side of the Atlantic the term 'freight' is not applied to cargo itself as in the American idiom, but to the money paid for carrying cargo.

New England Seafarers

These hardy, self-reliant, eager, impudent New Englanders at the opening of the century were cutting in everywhere. Bred on the rocky Atlantic coast, with their backs to an undeveloped hinterland full of hostile natives, they were forced to the seas for a livelihood—fishing, coasting, slaving, smuggling, privateering. The hard, dangerous, precarious life developed a character ruthless, independent, courageous, and brutal. They had no fettering traditions, but a people without a tradition is like a ship without an anchor. With all the terrible conditions that existed in the English merchant service, and in commercial life generally, there was still a sense of respect for things worthy and of good repute, and still a limit beyond which they would not go. The coarsest seaman paid his tribute to the East Indiaman. But these New England seafarers cared neither for God nor devil. The old Puritanism left nothing but its flinty ruggedness and insensibility—the spirit of the Roundheads, who battered those treasures of unique charm, our parish churches. When such a people take to the sea they will spare nobody; not even themselves.



A Water-line Model of an American Lakes Cargo Vessel

Then came the gold rush to California in 1848. Gold! The mad fever to get rich quickly spread like an infectious disease, and men from all over the world packed for the gold-fields. To the New England and New York shipowners this was a golden opportunity. The quickest route was not overland by caravan, but round the Horn by sea. They had the ships—fast ships. They had been building them for forty years and improving their design, increasing their sail to the last margin of safety and always to one end—speed. Slavers wanted speed, smugglers wanted speed, privateers wanted speed, and traders pushing in their noses at West Indian ports wanted speed. And out of this irregular history evolved a ship, built of soft wood, beautifully designed, the lines of her hull sharp and clean, with practically no flange or 'overhang' above the waterline forward to deaden the ship's way, cut so fine that she could sail forward or aft, making a stern-board if she missed stays, and carrying a mighty spread of canvas. Her raked sticks stood up over two hundred feet—aye, and more, with 'moonraker, spars. Beside an East Indiaman she was all lithe and graceful, slender as a race-horse beside a Clydesdale. And her men! They knew how to crack on sail and keep it there. Heavy-fisted bullying mates knew how to make their men move fast. "To 'Frisco or Hell!" was their motto, and they were indeed hell-ships. A ship-board sailing-routine was established that reduced all other efforts to a mere crawl. The ships were driven night and day at a suicide pace, the wind screaming through the rigging—on, on, through fair weather or foul, the men continually at the braces, taut as the ropes attending to their jobs—on, on, the passengers battened down below in a stinking cabin, while the crew, stiff with cold, drenched to the skin, fought the elements. It was common for all hands to struggle with stubborn sails for twenty-four hours at a stretch. Forty-foot seas racing round the Horn and the wicked hum of vibrating planking tells of the strain. How many were wrecked on those bleak inhospitable shores? The ships made record voyages. There was nothing on the sea as fast as the *Rainbow* and the *Sea-witch*. Nothing carrying the Red Ensign could touch these Americans for speed. The Indian monopoly too had gone in 1813, and in 1833 there was free entry into the China ports. In 1850 came the gold rush to Australia. The 'clipper' had come—the American clipper.

The Navigation Acts had gone. The British shipping industry—shipowners, shipmasters, and men—woke up. "C'est fini, la comédie"—the farce is over. This challenge had to be met. "We, the British shipowners," said Richard Green, with determined resolve, "have at last sat down to play a fair-and-square game with the Americans, and, by God, we will trump them!" The British shipowners and their men kept their word.

CHAPTER VII

CLIPPER AND WINDJAMMER—THE END OF SAIL

(1850 TO 1930)

Background of American Rivalry—Emigration and the American Monopoly—The Clipper Era—Some famous Clippers—Decline of American Tonnage—Clipper Racing—End of the Clipper—The Windjammer Training-ships—End of Sail.

> She's a flash Yankee packet,
> O Lord, let her go.
>
> SEA-SHANTY REFRAIN

HISTORY is a nation's memory, and to understand the bitter animosity which characterized American rivalry it is necessary to turn back its pages and very briefly consider the background which bred and fostered it. In 1763 there were more than thirty British colonies in America, fringing the Atlantic seaboard from the Gulf of Mexico to the St Lawrence river with no means of intercommunication except by sea. This naturally resulted in a lively coasting trade, and it laid the foundations of their seamanship and shipbuilding.

The people of the colonies were precluded from trading outside the Empire because, under the old mercantile theory, a colony was considered as an annexe of the Mother Country, from which she could draw her raw materials and to which she could export her manufactured goods. This policy of protection and flag discrimination only served to encourage evasive and illegal trading. America was two months' journey away from England, and in the shipbuilding yards of Virginia and Maryland were built fast sailers for the irregular traffic of slaving, smuggling, and privateering. This illegal activity went on, and the Home Government was powerless to suppress it. The trade of the French, Spanish, Portuguese, and Dutch colonies was just as rigorously controlled. The system always worked at the expense of the colonists, who could not ship in the most convenient ships nor trade in the best markets. But the consequences of such a policy were inescapable, for it caused continual friction and occasionally ended in war.

Background of American Rivalry

The British colonies in North America—for now we can term them British rather than English, since the Act of Union in 1707 had opened the reserved trades to the Clyde shipowners—enjoyed a large measure of self-government with elected assemblies, and, except the conquered French in Quebec, were controlling their own internal affairs. The French settlers were content, happy to escape the tyrannies of their homeland and unsympathetic to the British colonists' complaints. Lord North's treatment of the French in Canada is in striking contrast to his policy of irritation towards the British in America. A vigorous political consciousness developed, and the British colonists came to hold the opinion that the English Parliament, in which they had no representation, had no moral rights over them. This was most aggressively expressed by the Puritan New Englanders with memories of persecution in the Motherland, while the Middle colonies, which contained the growing seaports of New York and Philadelphia, were openly resentful against the Navigation Acts. They objected to being farmed to profit the Mother Country. In the Southern colonies of Virginia, Maryland, and Carolina the aristocratic traditions of English life were maintained, but these wealthy, patrician, slave-owning planters were offended by British commercial policy. All through the eighteenth century this sore festered, and statesmen in London failed to understand the intensity of American feeling and the determination of the colonists not to be considered as settlers to be exploited in mere 'plantations.'

The blundering, tactless, and vacillating policy of the British Government bore its sorry fruit in the American War of Independence, which opened in 1775, and in a perilous European War. The surrender of General Burgoyne to the colonists at Saratoga Springs in 1777 led to the entry of the French into the war. Spain and Holland also declared war against us, and the Baltic Powers, Russia, Sweden, and Denmark formed a league of Armed Neutrality against us. For a short while we lost command of the sea. In 1779 the American commander Paul Jones seized the English frigate *Serapis* off Scarborough. With the help of French and German soldiers of fortune under Lafayette, the irregular troops under George Washington finally defeated the King's armies, and when Cornwallis surrendered at Yorktown on October 19, 1781, the "Thirteen Colonies" were lost to the Empire. These were dark days for Britain. France and Spain had set America free in a spirit of revenge, and in February 1783 the peace at Versailles recognized the American Independence. It was on July 4, 1776, they had published their Declaration that governments are set up to preserve "the right to life, liberty, and the pursuit of happiness" epitomizing the theories of the French Revolution. It was in 1788 that Washington succeeded in establishing a 'Federal' constitution under himself as president, and the United States was born as a nation.

British shipowners welcomed as some compensation the retaliatory measures taken immediately after the recognition of American independence to exclude the New Englanders from the reserved trades, where already they were serious competitors. This only stimulated the Americans to build faster and more handy vessels to engage in privateering—a valuable stimulus to ship-design—and while we were engaged in the Napoleonic wars, American vessels stole into prohibited areas running the risks to win the profits of the neutral trade, defying British, French, and Spanish prohibitions, with speedy brigs that could elude or escape from the watchful cruisers. Such a history set a premium on speed. They were quicker when the peace came than any of their rivals to see the commercial advantages of speed in the carriage of passengers, mails, and certain types of cargo. Though they built ships under tonnage rules very similar to those applying in England, which, in measuring up the internal capacity of the ship for tonnage, half the beam could be taken to represent the depth of the ship, resulting in a hull built narrow and deep, handicapping speed, these mainly were engaged in the general coastal cargo trade over their own protected waters. No such restrictions bound the ships built for foreign trade. The Yankee brigs and schooners won their popularity because of their fast sailing. It was the American's ruthless scrapping of old regulations that forced the British to do the same when they passed the "New Builders' Rule" of 1835.

The ill-will of the Americans towards the British blazed up again seven years after the defeat of Napoleon in a war we forget and the Americans remember, and which had only one redeeming virtue, that it concluded in a peace which provided a settlement of the three-thousand-mile Canadian frontier along an imaginary line without soldiers or forts that has remained peacefully undisturbed ever since. Is it any wonder that the American competition was so fierce and bitter? Is it any wonder that the Americans passed retaliatory Navigation Acts shutting us out of their protected waters? Is it any wonder that with skilled shipbuilders and seamen and ample supplies of timber at hand they set out to build a considerable mercantile fleet and break in to the British sea-borne trade. The emigrant traffic offered big rewards.

Emigration and the American Monopoly

Voluntary emigration by adventurers seeking fortunes in unknown lands, and by men and women escaping from political and religious persecution, there had been ever since overseas settlements had been established, and there was still a proportion of such emigrants. But, in the main, the swarming exodus from Europe to the West which went on through the greater part of the nineteenth century was emigration of a different kind. It was a tragic compulsion caused by bad economic conditions. Rather than idle and starve in a workless Europe the more vigorous and enterprising set their faces to the land of promise in America. This large-scale emigration began after the Napoleonic wars, which left a legacy of economic dislocation and widespread unemployment. In the decade after 1825 an average of thirty-two thousand emigrants left Europe annually for the United States, and by 1845 the average had risen to seventy-one thousand. The discovery of gold in California in 1847 and the continental revolutions in 1848 stimulated a still higher rise in the emigration rate. This mass-emigration not only made shipping history but American history. It created a demand for tonnage, and increased both the import demands and export surplus of the United States, thus expanding the volume of world trade. As it peopled the northern farm-lands with men and women flying from poverty and oppression—the nucleus of the growth of that spirit of isolationism which the Virginian Monroe had already made a creed—as it assimilated all the refugees from all the countries of Western Europe in its 'melting-pot,' it widened the cleavage between the plebeian North and the patrician South. It ultimately precipitated the American Civil War of 1861–65, which, under Abraham Lincoln, not only abolished slavery but prevented the secession of the Southern States and established the supremacy of the Union.

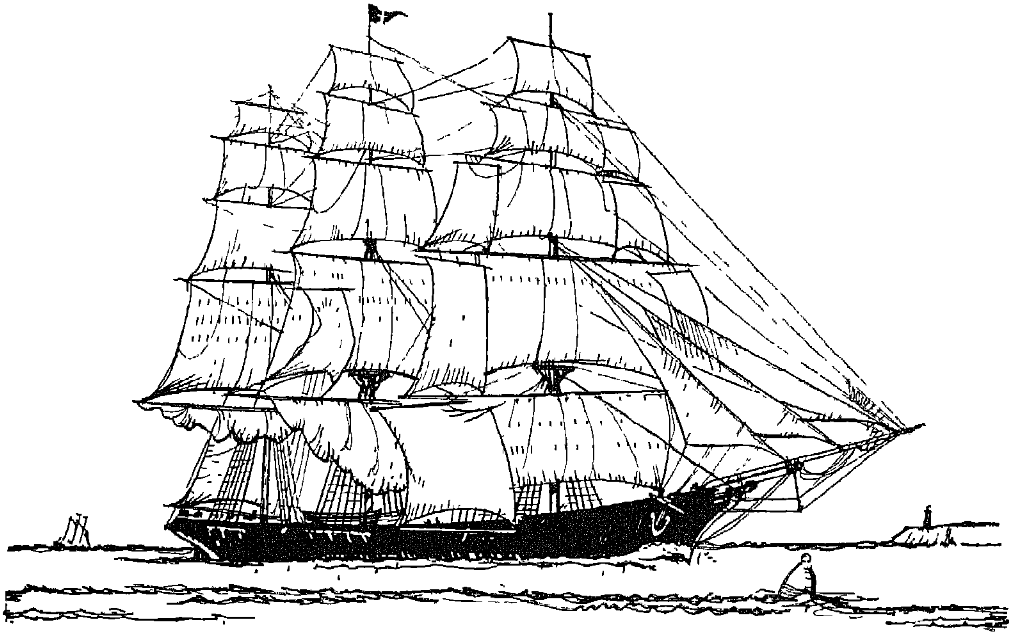
British shipping, in response to this expanding world trade, rapidly increased its tonnage. Up to 1835 the figure of 2,500,000 tons had remained fairly stationary, but *within the next ten years over a million tons of shipping was added to the register.* Yet that increase was merely the automatic answer to the greater transport demands in the reserved trades. It does not reflect any marked initiative on the part of British shipowners, nor do we discover any notable advance in the efficiency of their ships. The ever-growing volume of emigrant traffic was left almost entirely to the Americans. While ships of every nation and every flag made irregular passages across the Atlantic, mostly using inferior ships of poor quality, it was left to the Americans to run regular lines with fine, well-built ships. They held this monopoly practically unchallenged until the coming of the steamship in 1838, but the sailing-vessel kept its position as the cheapest and most efficient method of transport. It was when William Inman started carrying emigrants in screw steamers in 1850 that the sailing-ship rapidly began to decline, and after 1860 the American monopoly was broken, and the challenge of the British steamship had doomed the career of the sailing-vessel on the Atlantic. By 1870, the crucial year following the opening of the Suez Canal in 1869, the sailing-ship had almost disappeared from the Atlantic, and its acknowledged supremacy on the Far Eastern and Australian routes was formidably threatened.

Emigrant Sailing-ships

Let us imagine we are on the water-front in Liverpool somewhere in the eighteen-forties and the tide is high, while a gusty cold wind blows up the Mersey. The ensigns of the Atlantic packets lying in the docks flutter their "stars and stripes," for the British owners are not interested in this business and seem unable to realize its potentialities. They are content to sit back and make money without effort, taking their share in the increasing volume of world trade which comes without seeking over their protected services. The Americans meantime are butting in with their speedy brigs and getting charters from West Indian shippers, running the gauntlet of the frigates in watch for them, and snatching business, opening up agencies, and using all the devices of publicity to attract emigrants, and in Liverpool on this transatlantic service we do not see a red ensign. We stand and admire the latest wonder, the *New World*, a ship of 1400 tons, the largest yet built under the American flag. The Blackwallers are here too—the first line on this service and justly famous. The blue and white house-flag, horizontally halved, of the Dramatic Line, the red star on a blue ground of Robert Kermit's fleet, and the white diamond on a red background of the Boston packets of Enoch Train, and the red cross of the St George's Line all catch our eye.

What lovely ships they are with bow and stern carved with symbolic 'ginger-bread' work, with slim black hulls, long and lean, with decks white and spotless after much holystoning, with rails and brasses polished like mirrors, with masts and yards raking up to the sky carrying acres and acres of cotton duck. How graceful, how picturesque, how lovely they are as they sail down the Mersey bound for the States.

We have seen their crews—tough 'packet-rats'—and we have seen their passengers. In the state-rooms you meet the people of quality; there too you will meet the adventurous rogues looking for pigeons to pluck. But the majority are the emigrants leaving the Old World for the New—and with little but hope and the will to work as assets. Each ship sailing out of Liverpool carries some seven hundred emigrants in the steerage. It was no pleasure-cruise, despite the fancy and flowery phrases of the publicity men enlarging on the luxuries of the clipper ships, though the few saloon passengers who had paid their twenty-five pounds for a passage did get the service of one of the two darkey stewards on board, and in the ladies' cabin there was a stewardess and a sofa. The saloon accommodation was luxurious in many of the ships, so Basil Lubbock informs us in his *Westen Ocean Packets*. The emigrants travelling in the steerage had only paid five pounds and were stowed in treble-tier troughs, accommodating five passengers or more. These were placed between decks and were only about eight feet high and were knocked together by a carpenter. Only a plank separated each block of troughs from the next, and down there it was always semi-dark. Between each block of troughs ran an alley-way about a yard wide. To pass down that alley-way meant stumbling in the dark over piles of luggage and sprawling emigrants. In the steerage you had to provide your own food, cooking-gear, and bedding, and all that was provided was a galley fire, and many a squabble and fight there was over selfish users. This galley was on deck, not below, so that the discomforts and hardships of the passengers were greatly increased in bad weather. The steerage alley-ways were choked with every kind of miscellaneous hardware and provisions. There was not the least consideration for decency in segregating the sexes. In a heavy sea the ships 'worked'



A Typical Blackwall Clipper-ship engaged on Emigrant Sailing Service so much that if you sat on the 'tween-deck' your nether garments were often caught in the seams between the planks as the ship rolled, and you were held fast until she rolled back again and released you. In the early days it took about thirty days to make a passage, but the time occupied in making a crossing depended on the winds. Long passages were caused by the weather's being good, just as often as by its being bad. A steady, easterly wind would, of course, make possible a fast passage; calms and head-winds, even when very light, would make a long one. A gale often necessitated heaving to until the wind dropped. Forty days was nothing out of the ordinary when adverse winds were blowing.

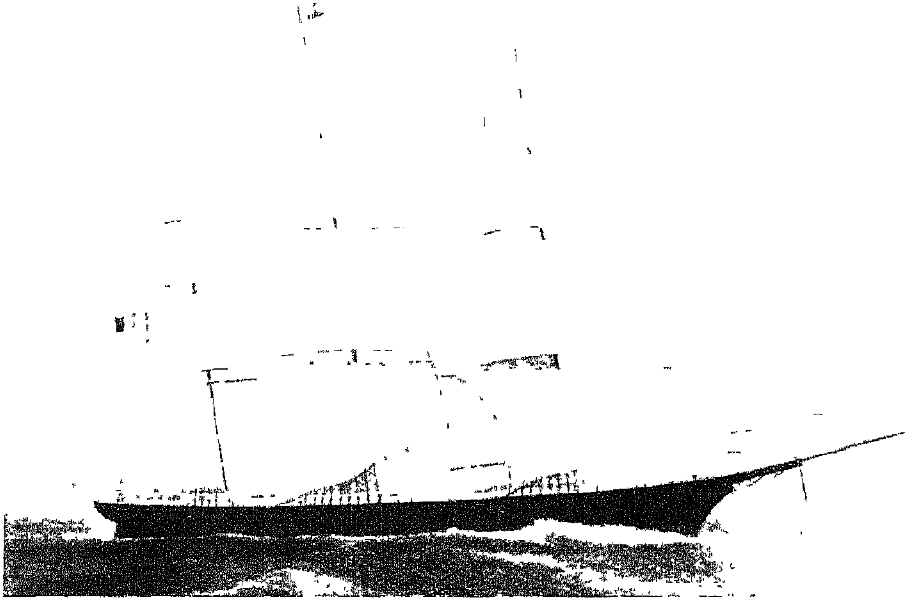
What a medley of people! What a babel of tongues in the steerage! English and Scots, many, many Irish, Swedes, Norwegians, Poles, and families of Germans, old and young, each with a heart-break for the homeland and their kith and kin left behind, all bound in one fraternity of a common hope for a new life. On the few fine days when the sails were billowing above there was fun and laughter and making of eyes among the young folk. The nights too, when the moon softly climbed the sky, and the foam of the wake was like a path of gold in the dark sea, there would be choruses to a concertina and dancing to a fiddle till the silence fell in a sort of dreaming, and lovers would keep their tryst. But when the storm blew, and they were all close-battened and stifled under hatches, flung together in sickly heaps amid baggage and provisions in a confusion worse confounded with every lurching roll of the ship, then there were curses and groans and prayers.

That "fell sergeant, Death," too often comes aboard among this herded humanity, and an outbreak of cholera or typhus takes, as it has been known to do, close on a hundred lives in a few days. But they had paid their fares, and burial at sea is cheap.

The Californian Clippers

It was the discovery of gold in California in 1847 that gave the most extraordinary stimulus to American shipbuilding and design. The route was protected by the American Navigation Acts, and so it was an American monopoly. The scramble to get to the gold-fields in the quickest time put it up to the shipowners to beat the transcontinental caravan-route through hostile territory, for the Redskins fought to keep their preserves. Passengers bound for San Francisco were willing to pay fantastic prices and endure every discomfort if they could be guaranteed a speedy passage. It was to meet this demand for a fast sailing-ship that the Boston shipbuilder, Donald McKay, and other American builders evolved that new and revolutionary type of sailer, the Californian clipper. The high passage rates and the monopoly of the service made it possible for designers and builders to eliminate all considerations of economic freight capacity and to concentrate entirely on speed. The employment of clipper-ships in the gold-rush was also due in part to the increasing superiority of steamships on the North Atlantic.

The Californian clippers were big ships for their day, far bigger than the average British merchantmen, which at this time rarely exceeded one thousand tons. There was a tremendous rush for accommodation. It has been estimated that over ninety thousand people sailed for San Francisco from the Atlantic ports between 1849 and 1852, so the service was highly lucrative. Donald McKay's *Flying Cloud* was 1783 tons by American measurement, and his *Sovereign of the Seas* measured 2421 tons. The 1851 passage of the *Flying Cloud* was made in 89 days 21 hours, averaging 227 miles a day for 26 days, with a best day's run of 374 miles, and in 1854 she did the run in 89 days 8 hours, a remarkable performance. *The Sovereign of the Seas* logged 1478 miles in four consecutive days, with a best day's run of 424 miles. These famous American clippers, so superior in speed as well as in sea qualities to contemporary ships built in this country, were revolutionary in design. The bows were fined to cut the waves with a minimum of skin friction, the stern, instead of squatting and holding the water, was designed to offer the smallest resistance. The ship was lengthened to five or six times her breadth—a proportion never attempted in British vessels. This extra length enabled a fourth mast to be carried and therefore more sails. These too were improved in cut.



The "FLYING CLOUD," DONALD MCKAY'S FAMOUS CLIPPER-SHIP

By courtesy of the Trustees of the National Maritime Museum, Greenwich

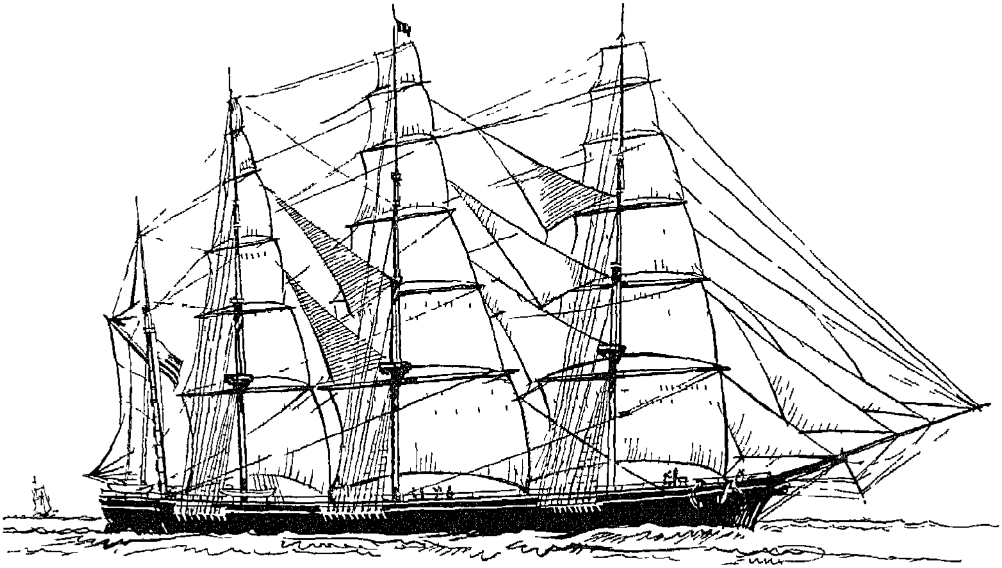
The clipper-ship era does not open until 1850, though the first clipper-schooner, the *Ann McKim*, was built in Baltimore in 1832. This ship was developed from a smuggler of about 1800, three-masted, with an extreme rake and a spoon bow. A remarkable set of circumstances stimulated clipper construction. There was the repeal of the

Navigation Acts, the gold-rush to California and to Australia, and the competition to carry the China-tea crop. There was the opium running from Calcutta to Hong Kong—a particularly discreditable trade forced on the Chinese Government by the East India Company, whose monopoly ended in 1833, and which aggravated the Chinese Wars of 1839, 1856, and 1858—and there was the race to carry the Australian-wool crop. All these set a premium on speed. Above all it was the final effort of the sailing-ship to compete with the steamship. Ever since primitive man set up a stick with a piece of matting to catch the wind ships had been driven with sails. By slow evolution they reached in the clipper-ship after thousands of years the perfect ship of the winds. There was no lovelier sight on the sea than that of a stately clipper, her canvas billowing in pyramids of power from scupper to truck, piling white crests of wave in front of her bows and leaving a broad wake of bubbling silver behind her—yet within the space of fifty years this perfect wind ship vanished for ever from the seas.

The Californian clippers, which had nothing but 'gold dust' to carry on the return voyage, raced across the Pacific to pick up a cargo of tea at Foochow or Hong Kong for Boston and New York. These ships, built to weather the storms off Cape Horn, their tall, tapering masts carrying an enormous spread of canvas, equipped with every known labour-saving device, and manned with a generous complement of sailors, had no rivals afloat either in appearance or performance. The American shipowners quickly realized their advantage over the slower British vessels, for whoever reached London first with the new season's crops commanded the highest rates. The first American clippers, chartering at Foochow for London, commanded nearly double the price of the English ships and loaded cargoes without difficulty, while the British ships were struggling to fill their holds. In August 1850 the American clipper *Oriental* arrived in Hong Kong, promptly loaded 1600 tons of tea for London at six pounds per ton of 40 cubic feet, while British ships were hard put to it to load at £3 10*s*. a ton of 50 cubic feet, and on December 3 she reached London after a record run of 97 days from Hong Kong. That performance was at once a revelation and inspiration to the more enterprising minority of British shipowners, but to the pessimistic majority wailing about the repeal of the Navigation Acts it was a portent of doom.

The 'gold-bug' infected both passengers and crews, and once inside the golden gates there was every risk of wholesale desertion from the mates downward. More than one good ship was wrecked, foundering at anchor or drifting ashore, their hulks being used to meet the big housing shortage in San Francisco. In 1849 captains, finding when they were due to sail that they had no men in their fo'c'sles, offered premiums to anyone who could get them. Thuggery and violent kidnappings on the 'Frisco water-front became so common and so organized a business that its racketeering became notorious. It was hardly less common in New York, and the New England ports, where crimps and customs-house officials worked hand in glove. Even when sailors were tumbling over themselves to ship in the clippers sailing to California the captains had to get their crews through the crimps and pay extortionate ransom prices, otherwise their customs confederates would refuse clearance.

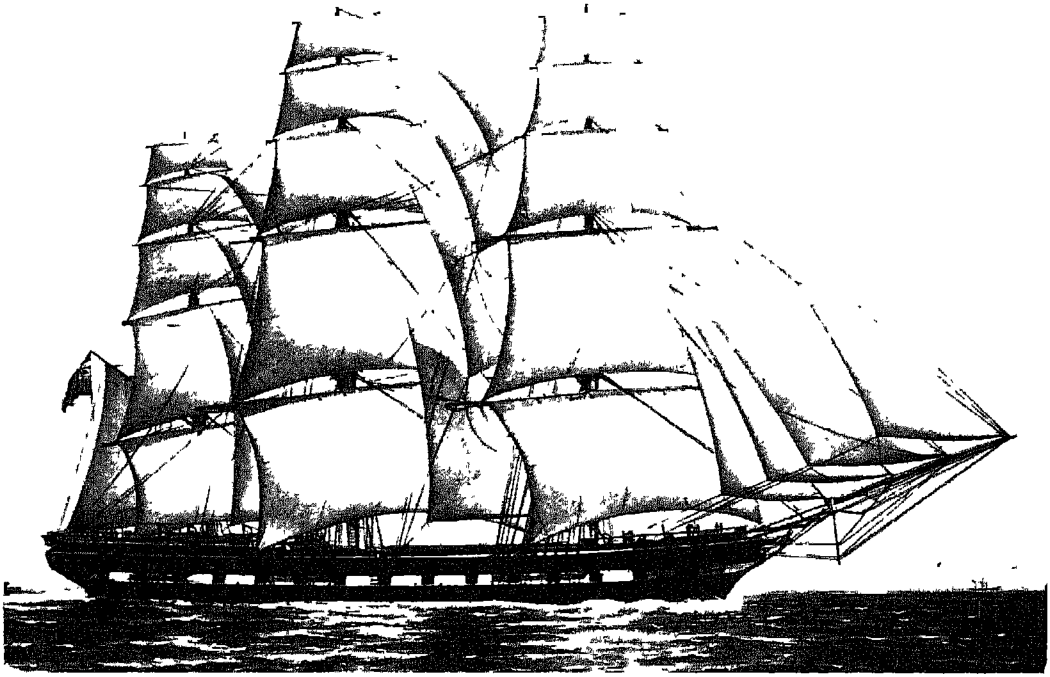
The advent of the American clipper, with its competitive advantage over British ships, roused the British shipping community to an appreciation of the benefits and profits to be got out of speed in specialized, lucrative trades. It led also to an overhaul of shipping conditions, for the state of things disclosed in the Board of Trade Report—the inefficiency and general slackness—could no longer be tolerated, and it led to the reforms in the standards of construction and the more reasonable demands of the first Merchant Shipping Act, of 1854. These relaxations of obsolete tonnage rules permitted British designers and builders to enter on level terms with their competitors. It needed a shipping crisis to wake the shipowners out of their complacency. Now the protections afforded by the Navigation Acts had been withdrawn they were forced to face up to the challenge of open competition. The discovery of gold in Victoria in 1851 opened a prosperous emigrant service to Australia. Liverpool shipowners, chief among them James Baines, sought the aid of the famous Californian-clipper designer, Donald McKay, and in 1853 he ordered from the Boston shipyard four of the finest ships McKay could build. The *Lightning*, the first of these built for the Australian emigrant service, had a record-breaking career. On crossing the Atlantic for delivery to her owners she raced the *Red Jacket*, owned by the White Star Line, and both ships, in a drawn result, made astonishing passages. The *Lightning's* best day's run was 436 miles, and the *Red Jacket's* 413 miles. The latter made the passage from Sandy Hook to Liverpool in 13 days 1 hour, while the *Lightning* took 13 days 19½ hours from Boston Light to Liverpool.



THE "GREAT REPUBLIC," THE LARGEST WOODEN CLIPPER-SHIP EVER BUILT

This vessel, designed for the Australian trade, was launched in Boston in 1853. It was 335 feet long and 53 feet wide and carried four masts

The career of the *Lightning* under her skilful and daring commanders is an epic story of seamanship and sailing qualities. She made her first outward passage to Melbourne, under Captain "Bully" Forbes and his mate, "Bully" Bragg, in 77 days, and on the homeward journey established a record never equalled under sail, completing the trip in 64 days 3 hours and 10 minutes. In 1855, under Captain Enright, another splendid sailor of a very different type, she did the homeward journey in 68 days, and in 1856 did a phenomenal performance by travelling 2188 miles in 7 days, making an average of over 300 miles a day. Serving as a troop-ship in the Indian Mutiny, she outsailed every other vessel, either steam or sail, making the passage from Portsmouth to the Sand Heads below Calcutta in 87 days. It should be added that the sailing-ship record from Melbourne home in 64 days is by the log and has been doubted by many American authorities who cannot be accused of being biassed in this matter. That she was a magnificent sailer cannot be disputed. It was with American-built ships, bought or chartered by the big Liverpool shipowners, that the fastest passages were made during the Australian gold-rush and in which the greater proportion of the emigrants were carried.

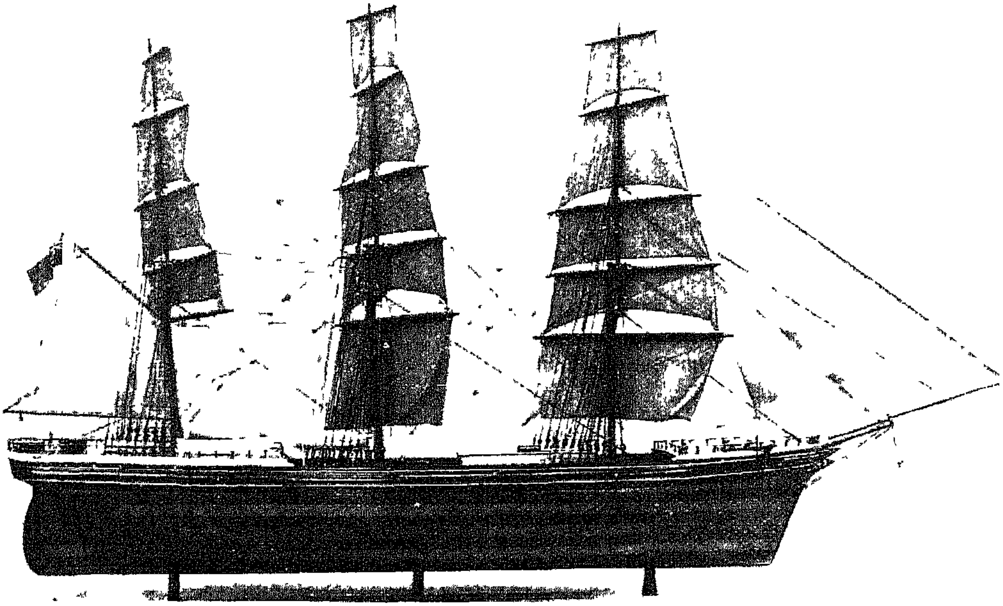


THE CLIPPER-SHIP BLACKWALL FRIGATE "MALABAR," 1860

This vessel of 1350 tons was employed in the East India trade and was a favourite trooper during the Mutiny
Her record passage from Calcutta to Dover was 89 days.

From a photograph in the Science Museum, South Kensington Crown copyright

These American-built ships in 1850 were not only bigger and faster than the British ships, they were cheaper too, being constructed of soft woods, of which there was an inexhaustible supply. This, however, was a doubtful advantage, because British ships of oak and teak were not only more durable but less subject to waterlogging. The sailing qualities of the American ships deteriorated at a quicker rate, and their seeping planks made them far from ideally suited to the tea-trade. On this service they could not be guaranteed to deliver their delicate cargo in perfect condition. Actually wool, not tea, was regarded as the ideal clipper cargo, because the ship required far less stiffening by shingle ballast.



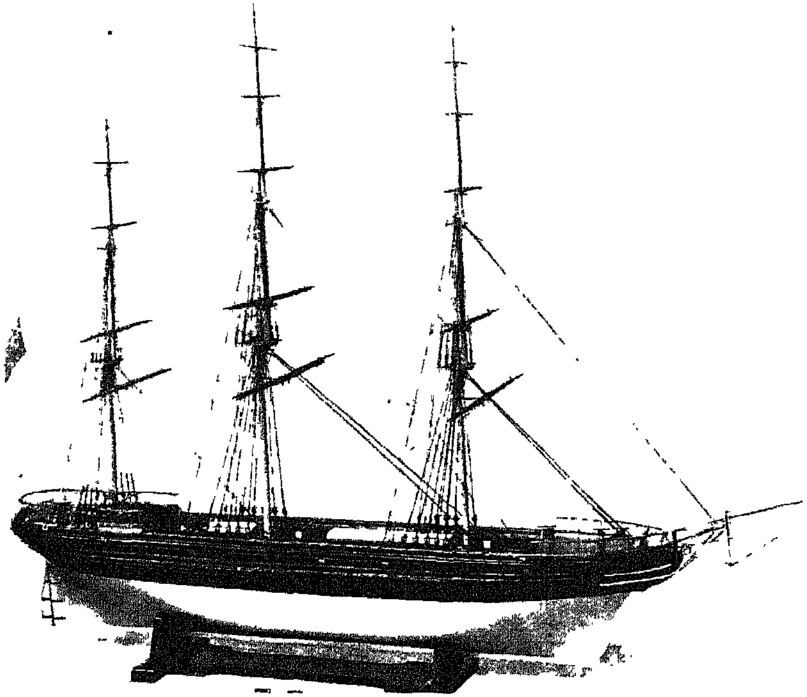
A RIGGED MODEL OF THE SHIP "STONEHOUSE" (1866)
This vessel was a wooden sailing-ship engaged in Australian trade She had accommodation for forty passengers and large cargo-carrying capacity

From a photograph in the Science Museum, South Kensington Crown copyright

British Clipper-ships

British shipbuilders, now on their mettle and freed from cramping building regulations, took up the challenge. In small craft there were many speedy types. The smuggling lugger and the revenue-cutters had a fine turn of speed. Then there were the post-office packets from Falmouth, and those Blackwall frigates built by Pile, of Sunderland —the *Kent,* to name only one—which were making fine passages. Hall, of Aberdeen, had a reputation for building a flyer, for in 1839 he had produced the *Scottish Maid.*

It was from his yard that the splendid *Sir Lancelot*, 210 feet long, was launched, which, in 1869 under her daring commander Captain Robinson, broke the record by making the voyage from China in 89 days. Hall also built the ill-fated clipper the *Caliph*, lost mysteriously on her passage from New York to China in 1870, of whom Captain Shewan, in his memoirs, *The Great Days of Sail*, wrote she was the fastest of ships. But Hall's, of Aberdeen, made their name in the early days of the tea clippers. It was Steeles, of Greenock, and Hoods, of Aberdeen, who brilliantly developed the later clippers. It was the small type of clipper which proved most profitable on the tea-trade. Some of the most famous were under 900 tons. Willie Steele, like Donald McKay, was a genius in naval architecture. These designers, by some miraculous instinct, seemed to know the extreme limits to which safety could be pushed in the interests of speed, and their craftsmanship produced ships unmatched for beauty of line and brilliance of performance. "Commerce inspired them and commerce maintained them, and out of the needs of commerce an exquisite work of art was created." It was Steele who built the *Ariel*, a very yacht in her delicate cut, a 'ghoster,' who could skim

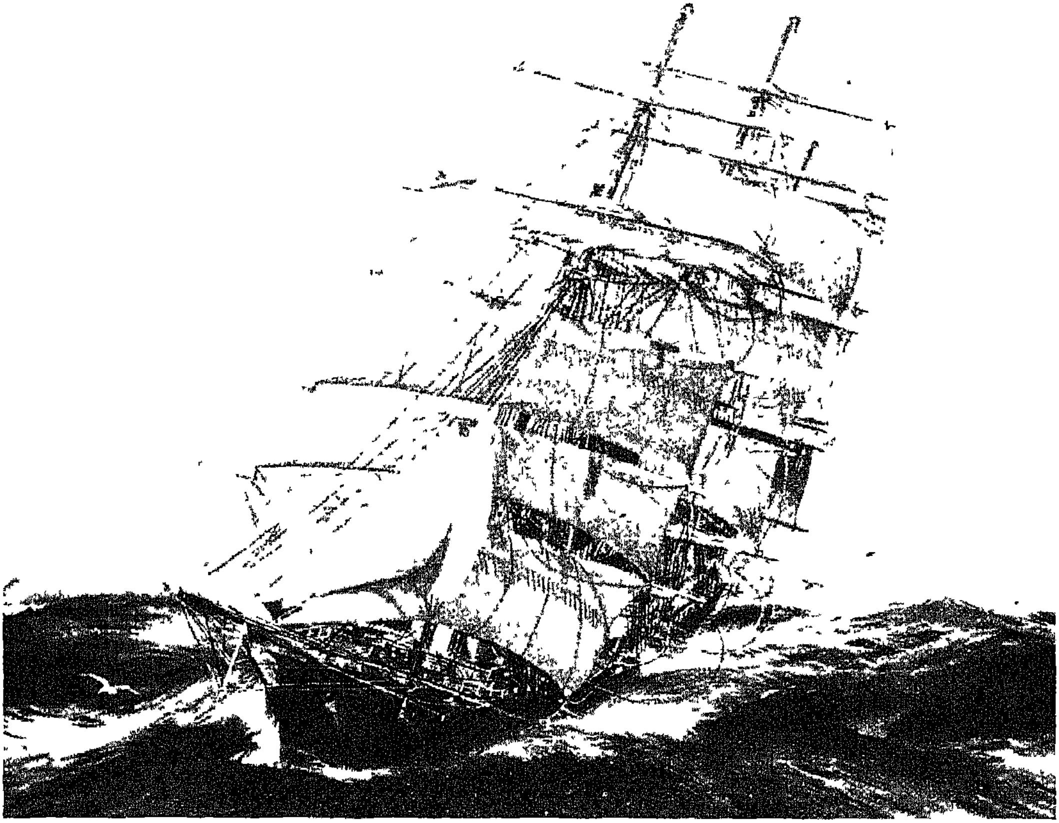


A MODEL OF A TYPICAL CHINA CLIPPER ENGAGED IN CHINA TEA-TRADE (1850)

These vessels were wooden-built with a copper sheath and were about 900 tons.

From a model in the Science Museum, South Kensington Crown copyright

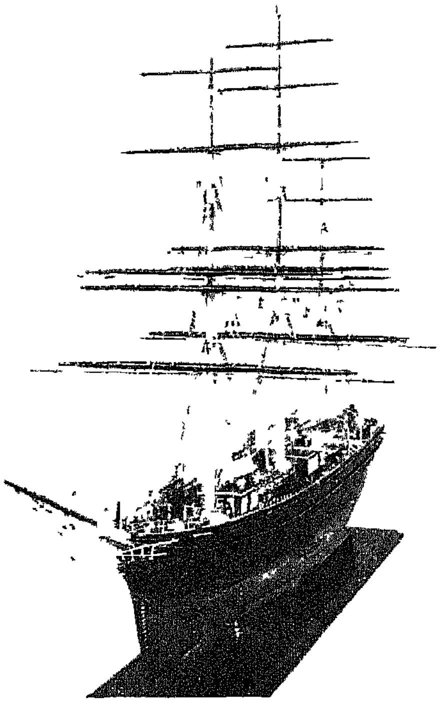
the waters in the lightest of airs, a superlative flyer, one of the swiftest in the China fleet Built in 1865, she had a gross tonnage of 1058 tons, was 195 feet long, 33 feet 10 inches broad, and had a depth in hold of 21 feet. Under her commander, Captain Keay, who disciplined his crew on naval lines, she made wonderful passages, the most famous of all being in the famous homeward race in 1866 from Foochow to London. The *Titania*, from the same yard, was a flyer too. Opinions on the merits of these racing clippers are hotly contested. Shewan voted the *Ariel* as "the fastest of all the clippers," and he was making comparisons with those two justly famous ships, *Thermopylæ* and *Cutty Sark*. The great *Thermopylæ* was launched in 1868 from Walter Hudd's yard, and on her first voyage broke three records—London to Melbourne 63 days, Newcastle (N S W.) to Shanghai 28 days, Foochow to Gravesend,



"THERMOPYLÆ"
From the painting by the late Jack Spurling
By courtesy of Seven Seas Fine Arts (1945), *Ltd*

against the monsoon, 91 days. She had a gross tonnage of 991, measured 212 feet from stem to stern, with a beam 36 feet, and depth of hold of 21 feet, and was designed by Bernard Waymouth.

It was Basil Lubbock's opinion that the *Cutty Sark* was "the fastest ship that ever left the ways." In his *China Clippers* and *Colonial Clippers* he is their recognized historian. These later British clippers, though smaller than the American ships, were of composite construction, with iron frames and wooden planking, and the whole under-water body was copper-sheathed to above the water-line. Designed to take advantage of the light and variable winds in Eastern waters, they proved so superior as tea clippers that the Americans were driven out of this trade. But the *Cutty Sark* was built too late for this China service. Designed by Hercules Linton, she was a few inches longer than her rival the *Thermopylæ*, though her gross tonnage was rather less. After a chequered building-history her Clyde builders went bankrupt before she left the stocks. She sailed up the Thames to Blackwall in 1870, a brand-new ship, the admiration of all. Her maiden voyage to Shanghai took 104 days, and her captain, Moodie, found it necessary to make adjustments and repairs while at sea. It was on the Australian service that she made her records. She had few rivals either for speed or beauty. She met the *Thermopylæ* in races from China, but misadventure so handicapped her that no fair comparison could be made. Ill-luck seemed to dog her. In the 1887–88 season on the Australian wool passage the two raced home, and under her most famous commander, Captain Woodget, she covered the distance in 71 days, beating her rival by eleven days. She was a wonderful sailing-ship. Her figurehead of Burns's witch, Nannie, in her cutty sark, or short skirt, stretched out on her bow, cut by Fred Hellyer, the famous Blackwall carver, her teak-wood planking, her decks and fittings with iron beams fashioned in grace and strength, her canvas stretched, she scudded like a live thing on the face of the waters. The *Thermopylæ* and the *Cutty Sark* eventually passed into Portuguese hands, and in 1907 the former was sunk in the Tagus while being used as a gunnery target. The *Cutty Sark* was bought back by Captain W. Dowman, rigged again, and sailed homeward under her famous Captain Woodget to be preserved—the only one to be preserved—and now she lies moored in the Thames, off Greenhithe, near the training-ship *Worcester*.



A MODEL OF THE FAMOUS "CUTTY SARK" (1869)

By courtesy of Dr C. N. Longridge, from a photograph in the Science Museum, South Kensington

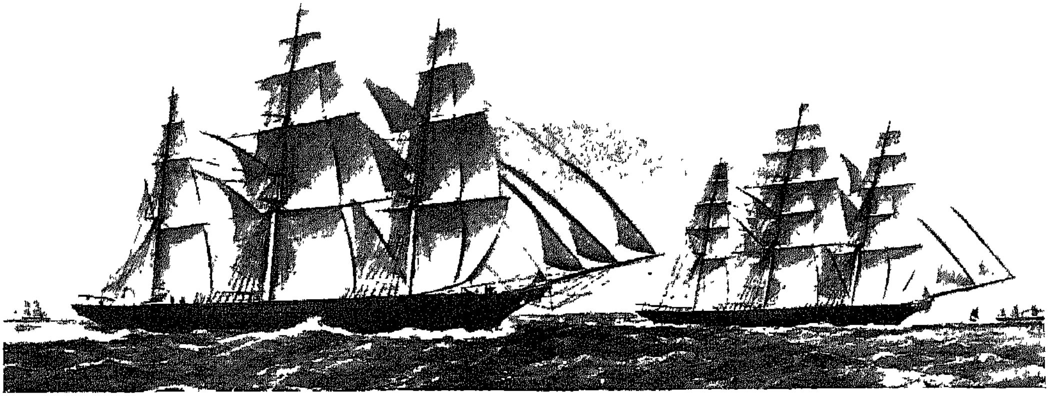
No mention of the clippers of the seventies and eighties can omit those of the Loch Line—Shaw Saville's beauties—and those of the New Zealand Company, which won such admiration for their performance and grace. These clipper-ships did a great deal towards restoring high standards of seamanship, discipline, character, and pride to the mercantile marine. They set a pattern in their smartness of paint-work and bright-work to copy. Training in sail inculcated self-reliance and resourcefulness. Even the collier-brigs, bringing coal down the East Coast, emulated the clipper's example, and Lord Runciman, who began life on board a collier, has paid great tribute to the spirit of sailors and apprentices who got such a grand training in sail, for these ships bred a "hardy, dauntless, unconquerable race of men." It is a pity such training is not availabe to British boys now.

Between 1860 and 1880 the American tonnage had halved and the British tonnage doubled. What was the explanation? Where was the courage, initiative, and enterprise that had enabled the Americans to maintain their shipping through our blockade in 1812–14, enabled them so to increase their tonnage that in 1860 it was only half a million tons less than the Empire total, and made them pioneers of the clipper? The answer does not lie in any lack of these virtues but in changed conditions, especially in the change-over from sail to steam.

The American Civil War gave the first blow, for the destruction of shipping by the Confederate cruisers caused the transfer of over half a million tons to the British flag. This in itself was not irremediable, and, had it been worth while, these losses could have been replaced in due time. There was a more fundamental reason. The settlers were continually moving to the West, and the virgin soil yielded giant crops of golden grain, which the hungry markets of industrial Britain were ready to take; the forests yielded plentiful supplies of timber, and the mountains held rich deposits of minerals. The exploitation of these great natural resources in the Middle West and West commanded both capital and labour, for it offered quick and rich returns. There was a concentration on the developing of internal communications—road, river, and canal—and then in the seventies and eighties railways were built across Canada and the States by which cheap wheat could be brought to the east coast and thence by ship to England, ruining the English farmers but providing cheap bread in the cities. The Union Pacific in 1869 was the first railway to span the American continent. America was an agricultural land, mainly providing the raw materials and not yet industrialized. Britain, on the other hand, had passed through the changes of the Industrial Revolution. We had developed the application of steam-power and worked up the iron shipbuilding and marine engineering industries, and as the economy of the steamship improved the wooden sailing-vessel could not compete. The Americans tried for some time to continue the competition with wooden ships, but it was hopeless. This change-over from wood and sails to iron and steam probably hastened the decline of American shipping, for in this sphere of the power-driven ship they were out of the race. The screw-propeller, the compound engine, the surface-condenser, and iron in place of wood for hulls were the decisive factors. Capital and enterprise found a better and more secure return in the development of the hinterland and the Far West of the continent.

Clipper Racing

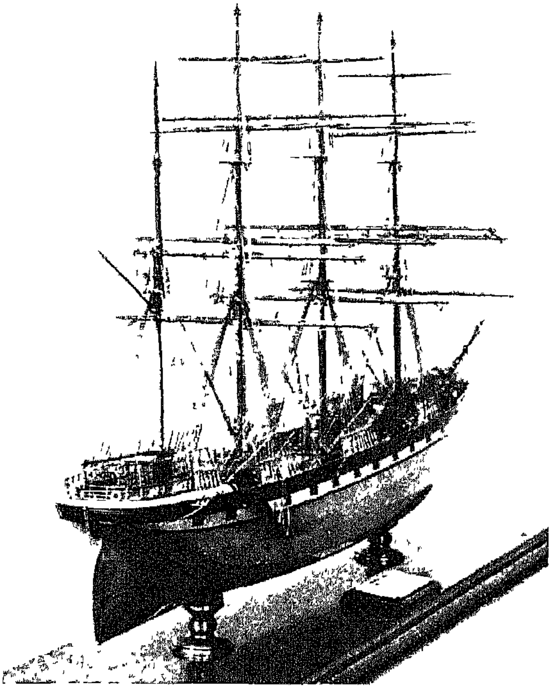
Probably the most historic race in clipper history was started on May 30, 1866, when the *Ariel*, *Taeping*, *Fiery Cross*, and *Serica*, all 'cracks' of the tea-trade, left Foochow for London with the *Taitsing* only a day behind. With half-way round the world to go which would dock first? Twenty-one days out the *Fiery Cross* was leading but was being hard pressed by the *Ariel* and the *Taeping*. Off the Cape of Good Hope the *Taeping* was half a day behind, the *Serica* was seemingly out of the race, and the *Ariel* was hotly chasing the *Fiery Cross*. By St Helena the *Taeping* caught the wind, and passed the *Ariel* and the *Fiery Cross*, while the *Serica* then overhauled and passed the *Ariel*.



THE SHIPS "TAEPING" AND "ARIEL" IN THE CHANNEL DURING THE RACE FROM CHINA, 1866

By courtesy of the Science Museum, South Kensington

After seventy-three days, off Cape Verde Islands, the *Ariel* took the lead, leaving the *Taeping*, *Fiery Cross*, and *Serica* a day behind, but the *Taitsing* was a week behind and out of the race. Ninety-eight days out from Foochow the *Ariel* sighted Bishop Rock Lighthouse in the Scillies, and at dawn the *Taeping* sailed by. The two ships swept up the Channel together at over thirteen knots, with the *Serica* abreast of them on the other side of the Channel. At Deal they picked up their tugs. Here was the gamble. Who would get the best? It was the *Taeping's* luck to get the better one, so reaching Gravesend an hour before her rival. But they had still to be docked. The *Ariel*, after ninety-nine days, reached the East India Dock at nine in the evening. The *Taeping* made for the London Docks, farther up the river, reached there an hour later and was moored without delay, whereas the the *Ariel* was not so lucky, and her mooring was not completed until twenty minutes after that of her rival. The same night the *Serica* berthed. After much debate the race was declared a dead heat, and the prize of £100 and the premium of ten shillings a ton for the first cargo home was shared between the three captains. In her short life of seven years the *Ariel* set up the record between London and Hong Kong, this was seventy-nine days twenty-one hours, and no other sailing-ship ever equalled it. In 1872 she was put on the Australian service, but on her first trip failed to arrive. She sailed under while running her Easting down. It is generally surmised that she was caught in a gale too strong for her excessively fine lines and was engulfed by the sea. The *Ariel*, *Taeping*, and *Serica* were all built by Steele's, of Greenock. When the famous firm of Steele and Company collapsed in 1883 their yard was taken over for a short time by Joseph Russell, a pioneer of the standardized sailing-ship.



A MODEL OF A FOUR-MASTED BARQUE (CIRCA 1880)

By courtesy of C. H. Lines, Esq., from a photograph in the Science Museum, South Kensington

What was the deciding factor in these races? Was it the trim of the ship? Perhaps. Was it the luck of the wind? Perhaps. Was it the design of the hull? Perhaps. Was it a question of equipment—a new suit of sails might mean a knot in light weather? It was all these and more; much more. Everything depended on the captain. Nerve, skill, energy, the ability to get the last knot of speed in all conditions, the art of seamanship to catch every favourable current in the ocean and every flaw of the wind, the power to evoke in officers and men the spirit of keen and willing co-operation—these were the imponderable and decisive factors when the designers and builders had done all that they could do.

Many are the stories told of these clipper captains, and though some are doubtless apocryphal, they all show the marvellous sea-sense and dauntless spirit of these men. The notorious "Bully" Waterman, of the *Sea-witch* and the *Challenge*, ship-driver and man-driver, pious hypocrite ashore and devil at sea—he murdered one of his men—it is said, ordered his steward to bring a bucket of sea-water to wash off his shore-face, and is credited with padlocking his sheets, other accounts say his halyards, when he went off the deck. When the *Cutty Sark* was driving before a hurricane, her timbers groaning and cordage shrieking, heeling madly in the flying scud, a nervous officer approached Captain Woodget; but the captain did not listen, for he was whistling a jig. He knew his ship and every sail and rope on her, and before putting to sea tested them all. And Captain Shewan's story, though told of a whaler of Captain Bob Martin, is typical and worth quoting. "What's the matter wi' ye, Jamie?" he said to his mate, who suggested it would be prudent to take in sail. "Ye're no' feared, are ye?" he added, and went back to his bunk. The wind tore through the shrouds. Later the skipper asked sleepily of the mate, as he poked his head in at the captain's door, "How's she *doing, Jamie?*" "*Fine,*" *said Jamie.* "*Fine! The three topgallant masts are over the* side, and twa o' the boats is awa'—*but I'm nae feared.*" Racing in a clipper was no picnic. It was a protracted battle with nature, demanding ceaseless vigilance, courage, endurance, determination, and skill, with the phantoms of disaster and success throwing their dice on the reeling ship, as she rode the storm.

That tea had become so valuable a commodity reveals a change of habit and of public sentiment from the days of the Georges, when inglorious carousals were fashionable and drunkenness was common in every grade of society. "He who aspires to be a hero," wrote Dr Johnson, "must drink brandy." Fifty years later Sir Walter Scott in 1825 wrote, "Sots are excluded from the best company," and, though Dickens in the sixties wrote jovially of intemperance, his novels grew more serious on the subject in later years. Tea in Victorian times became a recognized beverage, and the reduction of the tea duties in 1876 increased the demand and developed plantations in Assam and Ceylon. The popularization of tea through the chain-stores pioneered by Lipton and again through the tea-houses pioneered by Lyons made it a national beverage. These *vast stocks of tea were carried by steamships, for the clippers had been run out of* business.

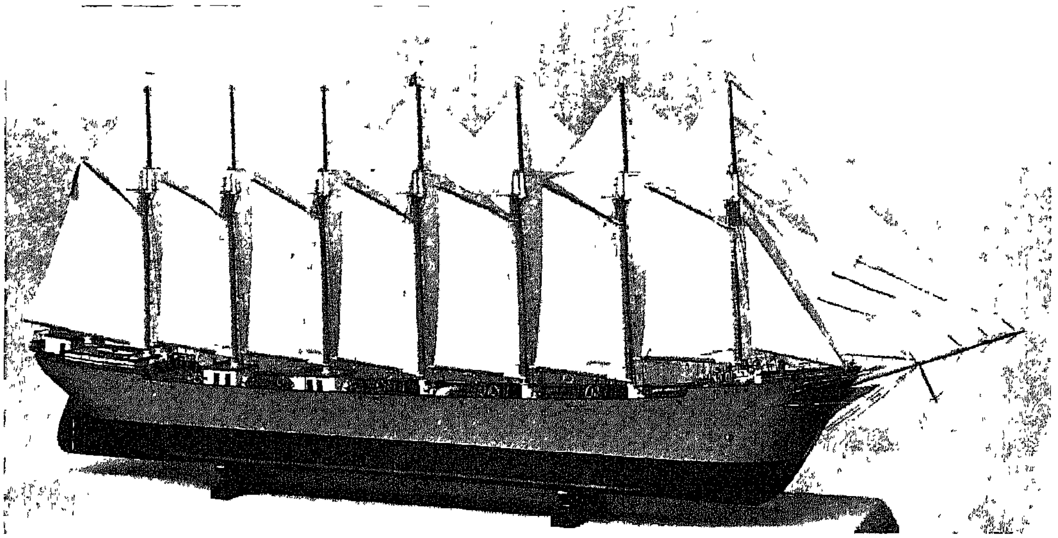
The clipper, however, more than held her own on the Australian run, where steamers lacking coaling facilities were at a disadvantage. The attempted compromise of combining sail-power with steam-power from auxiliary engines proved a complete failure. Fast sailers had been carrying the mails since 1855, when Pilkington and Wilson's line of seven ships, six of which were Canadian-built, the other being the famous American-built packet, *Red Jacket*, secured the contract. Most of the mails and passengers and all the goods traffic was carried in sailing-ships, and though the Orient Line opened a direct, regular steamship service in 1877 the big passenger-sailers did not lack passengers, and right into the nineties the sailing-ship held her own with the steamer; indeed, steamers were in some cases converted to sail, but they never had the beauty of the true windship.

The Windjammer

The clipper-ship proper, such as the Thermopylæ and the Cutty Sark on the Australian passage, gave place to the windjammer, so called because she could be jammed close to the wind. Built of iron and full rigged, ships like the *Brilliant* and *Pericles*, much bigger than the China clippers, splendidly maintained the reputation for fast sailing. The *Brilliant* was 1668 tons gross, 254 feet 8 inches long, 39 feet 7 inches broad, and 24 feet 2 inches deep, while the dimensions of the *Pericles* were slightly bigger. The *Brilliant* under Captain Davidson did the outward journey from London to Sydney in 84 days.

The *Pericles* under Captain Largie did the same run in 88 days. The windjammers were full rigged and more spacious, largely replacing the clipper bow and long, yacht-like counter with the more practical, if less picturesque, straight, or raking, stem and cruiser stern, though the curved stem and stern continued right to the end of the steel sailers. The "Wool Derbies" were sporting events, and prominent ships and their masters were discussed with the keenness of students of form talking on racing prospects. But the steamers came to capture the wool-trade, and the windjammers had to look for cargoes where they could.

But they and their crews of "Paddy Westers" put up a stubborn fight against the steamers. Their captains held on to their canvas in the worst of winds in a desperate endeavour to make good time. They sailed through the North Atlantic gales, the Argentine Pamperos, and the Pacific typhoons. They weathered the Australian "Southerly Busters" and ran the Eastings down. Often they would log sixteen knots day after day. Tough going indeed, with decks sluicing icy-cold water, with sails cracking like thunder, and sometimes blown from the bolt ropes, with men shivering, soaked, and hungry, and with a miserable dietary, and owners cutting expenses irrespective of comfort and sometimes below the margins of safety.



A MODEL OF THE SEVEN-MASTED SCHOONER "THOMAS W. LAWSON" (1902)

This vessel was the only seven-masted schooner ever built, and was typical of the large schooners engaged in the North American coasting trade

From a model in the Science Museum, South Kensington Crown copyright

Right up to the opening of the Panama Canal in 1915 grain ships sailed from the west coast of North America, and this carrying trade in the nineties was almost a monopoly of sail; while for low-grade cargoes on long voyages, serving ports lacking efficient loading and discharging facilities, the sailing-ship found charters until well into the opening years of the twentieth century. But the clipper had gone for ever, and the windjammer struggled forlornly against time and tide carrying nitrate, guano, and ore, a beggar on the seaway. She had shorn all canvas above the topgallants in the Jubilee rig of 1887 in an effort to effect economies in man-power, and auxiliary engines were fitted to kick the ships through a calm. Barque-rig became popular—fore-and-aft sails on the after-mast and square on the others, because this permitted a smaller ship's company, but no economies or labour-saving devices could stay the inevitable improving economy of the steamers. The four-masted barques with full rotund lines, built big for the sake of increased carrying capacity and rigged to be worked by a small crew, managed somehow to hold the seas, though the old shell-backs, with memories of the slim 'ghosters,' the delicate 'China birds,' the fast-sailing clippers, dubbed these slower ships "boxes." Then came the schooners developed by the Americans on the coastal trade. They increased in size, and two-masters became four-, five-, and six-masters, and they were fitted with ingenious labour-saving tackle. These schooners put up a gallant struggle, for a dozen men could run a ship carrying 5000 tons of cargo. Still it was a hopeless encounter, for steamers independent of winds could make their passages according to schedule and discharge their cargoes on time. The worry of securing freights became a nightmare, for charterers naturally preferred a ship that could be reasonably certain of its probable date of arrival at its destination. The glorious clippers of America and Britain, the fuller-bodied windjammers, still lovely of line and speedy, the big carriers that sacrificed all to economy, the schooners that had little grace but used sail because it was the cheapest means of progress—all the deep-sea sailing-ships were doomed by the power-driven vessel—steam, electricity, and motor.

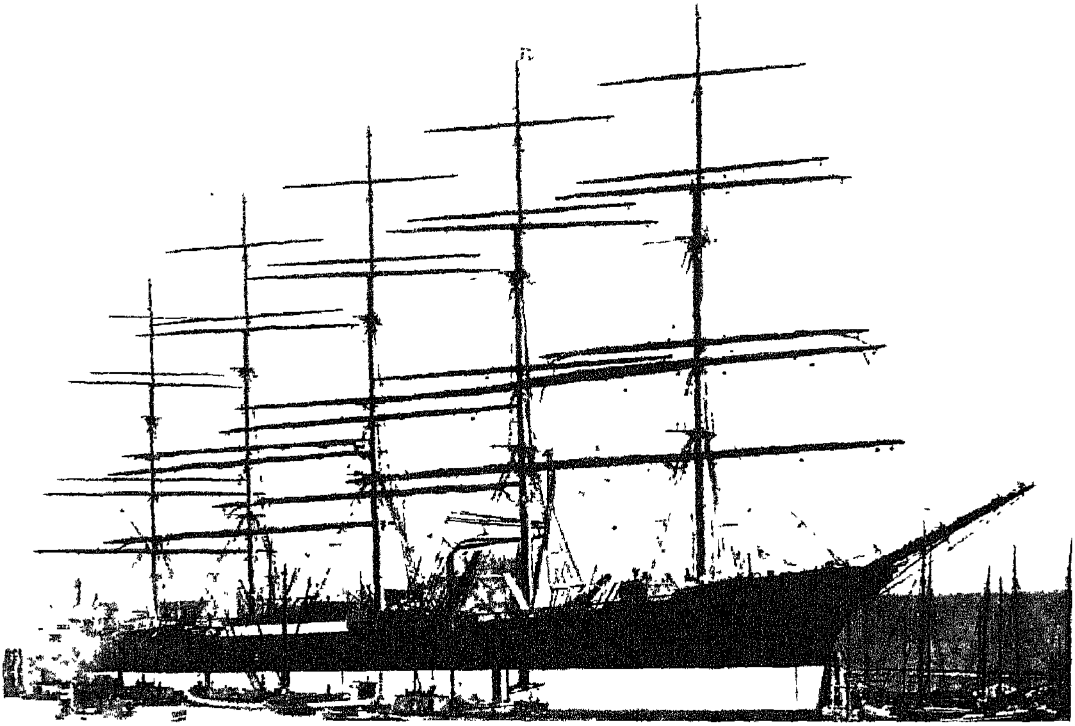
End of the Sailing-ships

Britain, the home of the steamship, let her sailing-ships go. When trade was good they were tolerated on the unprofitable services carrying timber from the Baltic, wheat from Australia, coals from South Wales, nitrate and guano from Chili, and lumber from anywhere to anywhere, but now steamers rather than sail in ballast have taken these trades too. So the Finns, the Swedes, the Poles, the Germans, the Norwegians, the Portuguese bought them and hogged the seas in the tramp trades till the great economic blitz which swept across America and Europe from 1920 onward laid them up, rejected and dejected, anchored hopelessly on the roads in all the sailing-ports of the world. The sea no longer wanted them. The ports had no welcome for them. The French, with a rash affection, continued to build the big sailer on bounties, but the bounties stopped, and with them the big sailers. Those that went under in the tempest nobly ended their career. Their end was clean. Wind and wave had made them; it was fitting that wind and wave should bury them. Those that reached home faced the ignominious lot of the unwanted. The underwriters rejected them by making premiums for overdue ships too high for owners. Some went for coal hulks, some were burned out as valueless, one or two went to the picture-makers at Hollywood, bought for a song, some went to the breakers' yards. To own these ships was a liability, and many were held for bankruptcy.

Then came the First World War, and many sailed again and many were lost. The tonnage shortage gave them a brief respite after the war, chiefly on the Australian grain-route from the Spencer Gulf, where the ports would not support steamers of a tonnage to make the run to Europe. But where were these deep-sea sailers found in an age of power-driven ships?

Though the deep-sea sailer was no longer an economic proposition, and the faith in her utility as a competitive carrier had gone, there was still a faith in her value as a training-ship. Germany, Finland, Belgium, Sweden, Norway, Portugal, Greece, Russia, and even Japan all decided it was worth while to train apprentices in sail. Germany, with a view to building up anew her merchant fleet, insisted that officers must be educated in sailing-ships. The famous 'P' Line—*Passat*, *Priwall*, *Pamir*, *Parma*, *Peking*, *Padua*, *Preussen*—some of them built since 1918 for the Hamburg Laisz Company were school-ships. The *Preussen*, built in 1902 by Messrs Jon. C. Tecklenborg A.-G., in Geestemunde, near Bremen, was the largest sailing-ship ever built. She was an enormous vessel, over 400 feet long, with five masts, over 5000 tons gross, deadweight capacity of 8000 tons, and carried 59,000 square feet of canvas. Her maiden voyage took sixty-five days from Geestemunde to Iquique. In 1910 she was involved in a collision off Dover and was beached in St Margaret's Bay and eventually became a total wreck. The famous *Herzogin Cecile* was built in 1902 as a training-ship for the Norddeutscher Lloyd. A fascinating diary of her 'race' with the Swedish-owned, British-built, four-masted barque *Beatrice* is given by Mr A. J. Villiers in *Falmouth for Orders*. Perhaps the most famous of all these training-fleets and the last of the deep-sea sailers was that owned by Captain Gustaf Erikson, of Mariehamn, Finland, whose sixteen ships, of which fleet the ex-German *Herzogin Cecile* was flagship, were all manned by boys under trusted captains. In 1927 this flagship easily won a race of seventeen grain-laden ships from Australia to the English Channel. She made the passage from Port Lincoln to Queenstown in eighty-eight days.

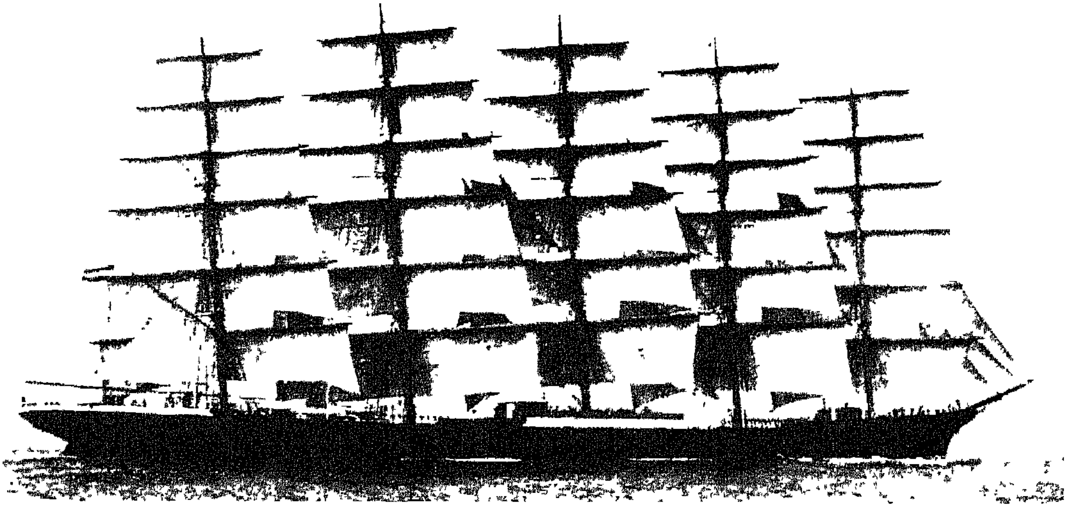
Only one British shipping company, and that the Marine Navigation Company, of Montreal, Canada, shared this faith in the value of sail experience sufficiently to subsidize a fleet of deep-sea sailers. This Garth Line, named after Sir William Garthwaite, its president, had only a short and yet an epic career. Most of them found a Viking's grave. The *Garthgarry*, a steel barque of 2300 tons deadweight struck heavy weather off the Horn while on a trip from Iquique to Queenstown with a cargo of nitrate. She was so battered on arrival that she went to the shipbreakers in 1924. The *Invercauld* was torpedoed in the Irish Sea in 1917. The *Invermay* was lost in the same year off Ireland, and the *Garthneil*, who made an amazing homeward voyage in 1919 from Melbourne with an average run of 192 miles per 24 hours, was bought as a hulk. The *Victoria* was sunk by a mine off Beachy Head. The *Garthway* was lost by stranding in a fog on Santa Maria Island in 1924. The *Garthpool*, the last of the fleet of six ships, sailing without hope of making a profit but flying the Red Ensign with pride, was the



THE "PREUSSEN" (1902) AT HAMBURG

She was the largest sailing-ship ever built

Nautical Photo Agency



THE "PREUSSEN" AT SEA

Nautical Photo Agency

farewell in 1929 of the British deep-sea sailer. She struck the Ponta Reef, Boavista Island, and was abandoned. All hands were saved.

Now "All—all are gone"! Shall we lament with Paddy in Eugene O'Neill's fine play *The Hairy Ape*, remembering the past days?

> Oh, to be scudding south again wid the power of the Trade Wind driving her on steady through nights and days. Full sail on her. Nights and Days! Nights when the foam of the wake would be flaming wid fire, when the sky'd be blazing and winking wid stars. . . . Work—ay hard work—but who'd mind that at all? Sure you worked under the sky, and 'twas work wid skill and daring to it. And wid the day gone, in the dog watch, smoking me pipe at ease the look-out would be raising land maybe. . . . Yerra! 'Tis a dead man's whisper. 'Twas them days men belonged to ships, not now. 'Twas them days a ship was part of the sea, and a man was part of a ship, and the sea joined all together and made it one.

"'Tis a dead man's whisper." Though the shanties echo down the seaways of time, the "tramp and go" was tearing the heart out of men pushing at the capstan or hauling on the ropes, though they sung and laughed and cursed the while. The "silver sails" of poetry, though they be but white-cotton duck meant climbing the topmasts in a vicious sea. "Storm along" meant breaking ships engulfed in mountainous waves, and the "drunken sailor" told of crimps and rum and debauchery. The sailing-ships had their romance and their glamour, their heroism and their beauty, but they had their realism too; brutal and ugly, with their 'bucko' mates, foul quarters, miserable food, wretched wages, and Herculean labours. They live now in the ship-models of the craftsmen, the paintings on the artist's canvas, and in the pages of literature. They have inspired the playwright, and in one film at least, *Mutiny on the Bounty*, we have an impressive document in the film history of seamanship. As late as 1896 a Board of Trade Committee on the manning of British sailing-ships condemned in strong terms prevailing conditions.

Of course, we lament the passing of the sailing-ship as a thing of beauty, and we remember her ethics of lash and press-gang, debauchery and servitude, belong to their age with counterparts ashore. But the steamship has come, something new, something different, and we sail into another era where ships with sail can fill no useful place in the commerce of the deep sea. The sailer has had her day—"O Lord, let her go!" And as for the men—the shellbacks who manned her—"The sea took some, the steamers took others, the grave-yards of the earth will account for the rest."

They mark our passage as a race of men,
Earth will not see such ships as those agen.

JOHN MASEFIELD

CHAPTER VIII

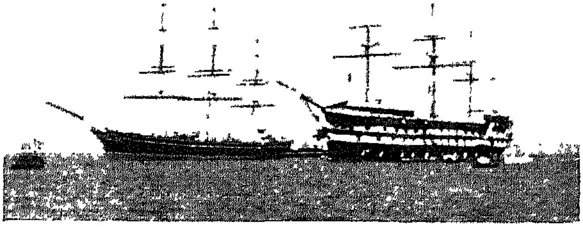
FIRST EFFORTS WITH STEAM

(1750 TO 1840)

Dockland—First Efforts with Steam—The Pioneers—The First Steamship Companies—Introduction of the Screw-propeller—Brunel—First Steamships to cross the Atlantic.

> Lord, send a man like Robbie Burns to sing the Song o' Steam!
>
> RUDYARD KIPLING, *M'Andrew's Hymn*

THE *Cutty Sark* to-day is as remote from the shipping around her as Cook's *Endeavour* or Drake's *Golden Hind* would be if either were to sail up London's river. If a deep-sea sailer moors in the Thames, as one did as recently as 1938, the event is unique enough to provide headlines for the Press; such an anachronism is she in these days of power-driven vessels. The power-ship opens a new era in water-transport. She is not evolutionary but revolutionary, for she represents a complete break with tradition. Any compromise with the sailing-ship works to her disadvantage both in efficiency and æsthetically. The first steamships made the attempt, with the result that at one fell stroke the glorious wonder and beauty that had been slowly and painfully evolved through the long history of the sailing-ship, a history as long as that of men, appeared to be destroyed. Not till conservative tradition had been scrapped could the power-ship evolve in accordance with her own needs.



THE "CUTTY SARK" AND H.M.S. "WORCESTER" IN THE THAMES AT GREENHITHE

Photo Bassett-Louke

For the power-ship is modern, different, and original. Her life is not in the sails but the engine-room. Her natural home is the port rather than the sea. She is tied to her fuel supplies and crosses the oceans sailing to a time-table. Her officers are composed of scientists and technicians, specialists confined to special departments—deck or engine-room—and her crews have specialized duties. The engine-room staff is proportionately bigger than the deck staff, which grows less and less numerous. The power-ship cannot wait on wind and tide, nor idly rock in the cradle of the deep, nor ride out a storm on a sea anchor, for her business on the great waters is with the ports of the world, and neither she nor they can wait. She was not built on a patch of grass by the shore's edge, but in a vast shipyard to the clang and clatter of steel frames, plates, and angle-bars. She is not a comparatively simple affair of wood and sails but a complicated mechanism, a steel wonder into which the concentrated efforts of knowledge, skill, and ingenuity have gone—one of the greatest works of man. Where would the ancient mariners be among the artificers and the engineers in a modern power-ship?

Dockland

There were green fields beside "silver-streaming Thames" when Elizabeth went to Tilbury. There were green fields when the John Company built that massive portal to the dock where the Indiamen came. The logic of the years has built huge docks, warehouses, offices, and slums. It has filled the green spaces with mean streets and the blue sky with the smoke of countless chimneys. It has intersected the greasy roadways with metals where wagons are shunted full of the world's merchandise. The bales are labelled, and reading them is to be whisked on a magic carpet to Bombay, Yokohama, Sydney, Buenos Aires, New York—where you will. There is the pungency of rubber, soap, and dyeworks in the air. Heavy motor-lorries and horse-drawn drays, in a confusion which is in fact orderly, squeeze down alleyways and narrow, cobbled pavements. Derricks and gantries, like gaunt skeletons, line the wharves, and giant cranes lean over and drop monstrous metal claws into the yawning holds of ships. There is an endless clangour of wheels and check-chains, a ceaseless rumble of traffic, and the harsh shouts of men. Here, sprawling by the riverside is a pageant of riches and poverty, the achievement of the new century, the progress of an era of coal and iron, the greatness and power which intimidated a world.

There is little evidence of the civilized virtues. If beauty is to be discovered it is only when the shadows of darkness soften the grim outlines into lace-work patterns against the sunset, hiding the squalor in their cloak. The taskmasters are still there and the slaves, but they are more politely named, and their methods are more subtle. The pawn-shops in the drab streets disclose them. In *Our Towns*,[1] a study of the effects of town-life—with the segregation of large numbers of workers in the crowded parts of our large ports and industrial centres—as revealed by the evacuation at the beginning of the Second World War, are some disturbing figures and facts addressed to readers "with stout stomachs."

> The Social Surveys of Merseyside, Sheffield, Bristol, and Southampton have shown a proportion of from 12 to 15 per cent. of their families or 22 to 30 per cent. of their children as living below the poverty line.

In 1937 one-third of the families of Britain had bread-winners earning less than £2 10*s*. a week. Let it be said in common fairness that in the last two generations the shipping industries have paid wages, especially to the stevedores, well in advance of other industries. Seamen and longshoremen received comparable pay to the workmen in the factories. The stevedores in dock centres like Rotherhithe, St George's in the East, Deptford, often have full pockets and often are guilty of deliberate absenteeism. The families of these workers do not, or should not, suffer from want. Alas, that is not the whole picture. The prospects of work congests the docks with crowds of unskilled labourers who will wait for days and even weeks to get a job. It was a constant menace to the fortunate, who lived in fear of being paid off, and provided the stiffening to employers reluctant to improve working-conditions. Dockland is not so much a reproach to the shipping industries as it is to the philosophy, now being vigorously challenged, that perpetuated social disparity and inequity; a philosophy of libertarianism which put private interests first; a philosophy that cynically permitted slums and depressed social conditions in all our big industrial centres. Not all the riches of the Indies dumped into dockland, nor all the profits of enterprising industry, are wealth enough while men who labour there have only slums for a dwelling, the murk of factories for a sky, and the fear of unemployment for a neighbour. There is no panacea for deep-rooted maladies. Poverty and insecurity, ignorance, poor health, squalor, the pitiful waste of child life, the acceptance of spurious substitutes for freedom, adventure, and achievement—all these are manifestations of our outworn way of life, which has its roots in the seamy soil of the Industrial Revolution.

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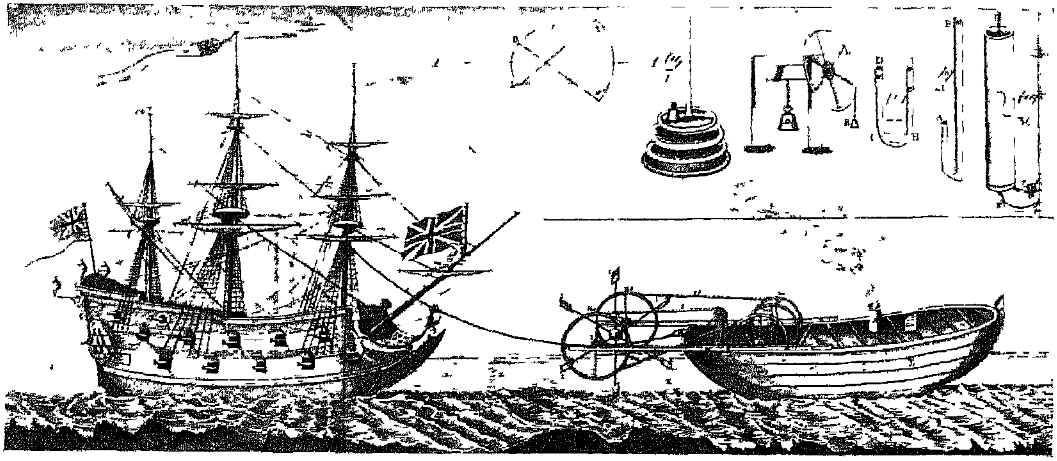
[1] *Our Towns: a Study made during* 1939–42 (Oxford University Press, 1943).

Side by side with the progress of applied science we had a social and economic system which could not keep pace with it. The inventors were solving the demand for new and cheaper forms of power and for improved communications. These in consequence developed the coal and iron resources and brought the Black Country of Staffordshire and Worcestershire into existence with its great new towns on the coal- and iron-fields. By the late eighteenth century cotton and wool, iron and coal became the basic industries of the nation. Further inventions in the nineteenth century, such as Bessemer's 'converter,' made it possible to produce steel in large quantities. Wrought iron is as old as the ancient Egyptians, but cast iron—that is, iron smelted by coal and, while white-hot, poured into a mould instead of being hammered into shape—was the means of producing the great pistons and cylinders of James Watt's engines and later the iron plates used in shipbuilding. The first steam-engines were stationary, producing goods in the factories to be transported by road and canal which Metcalfe, Telford, and McAdam on the highways, and Brindley on the inland waterways, had made serviceable. Meanwhile the inventors had concentrated on making engines that would pull loads. Murdoch and Trevithick, both Cornishmen, had built steam-carriages that were used in collieries at the beginning of the century, but it was George Stephenson, who built the first practical locomotive running over the colliery line between Stockton and Darlington in 1825, who is rightly considered the father of the railway system. This invention spelled the doom of road transport and crippled the development of our canal system. The more is the pity that railway companies were allowed to buy them up and let them become idle, sedgy waterways, for the war years taught us what considerable use our canals can be. They did not make this mistake on the Continent. The first railway to carry passengers was opened in 1830 between Liverpool and Manchester after Stephenson had overcome the difficulties of the swampy Chat Moss, and his engine, *Rocket*, which travelled at thirty miles an hour, is now in the Science Museum, South Kensington. The invention of James Nasmyth's steam hammer in 1839 used for forging large iron plates and bars made possible the building of iron ships. Ship- and boiler-plates are now rolled.

The Birth of the Steamship

The idea of propelling a ship by engine-power was entertained as early as 1698 by Martin Thomas Savery, though it never got beyond a thesis. In 1783 a steamboat was actually running on the Saône, near Lyons.[1] In 1737 a most remarkable book was published, written by a Gloucestershire inventor named Jonathan Hulls. He called it *A Description and Draught of a New-invented Machine for carrying Vessels or Ships out of or into any Harbour, Port, or River against Wind and Tide or in a Calm.* Hulls's attempt to employ steam practically in propelling a vessel in the water only excited derision at the time, but to him belongs the honour of being the first inventor of the steamship, though his boat was primarily intended as a tug and sank in the river Avon. Neither Hulls nor his contemporaries realized how great a future he had thus unwittingly prophesied for steam. He died in London destitute and broken-hearted.



A PRINT OF HULLS'S PROPOSED PADDLE-STEAMER, 1736

By courtesy of the Science Museum, South Kensington

In America in the 1780's John Fitch tried to build a steamboat for the developing river-traffic. He failed, was wholly discredited, and committed suicide. About the same time in Scotland John Ramsey built a steamboat which travelled at four miles an hour against the stream. He died in obscurity. In 1802 a Scottish miner William Symington, who had previously built himself an engine and made it drive a boat which the poet Burns came to see, built the *Charlotte Dundas*, which tugged two seventy-ton barges twenty miles in six hours along the Forth and Clyde Canal. Among those who witnessed it was Robert Fulton, of Pennsylvania, and Henry Bell, a millwright who had been employed by Rennie, the great civil engineer whose dock and harbour works and his Waterloo Bridge made him famous. But Symington had to abandon his steamboat because of the damage to the canal banks. He died in poverty nearly twenty years later, and by that time a number of small steamship-owners were profitably exploiting the fruits of his invention. A plaque in Grangemouth Dockyard records the fact that the *Charlotte Dundas* was the forerunner of all modern steamships. This enterprising invention influenced the whole course of ocean navigation and this historic steamship was invented by William Symington at the age of nineteen. A comparison between the *Charlotte Dundas* and the *Queen Mary* graphically reveals the progress during the last century and a half.

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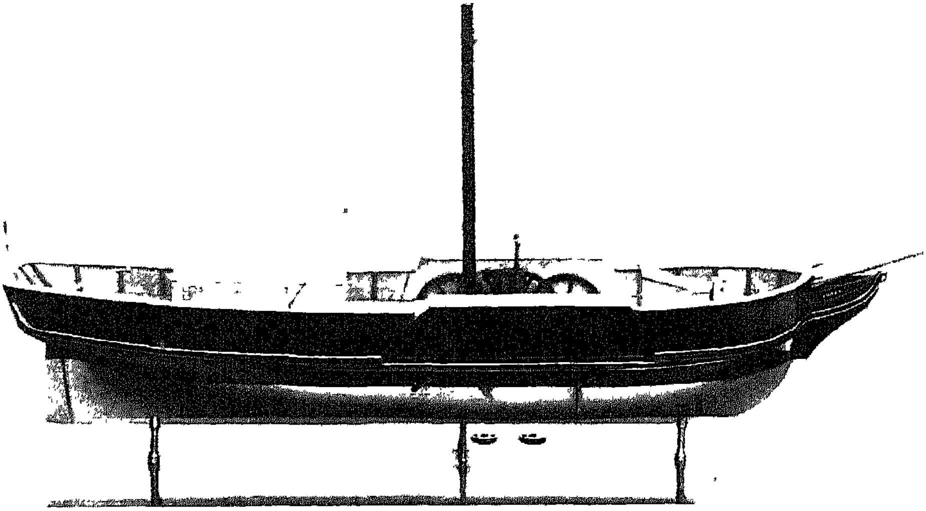
[1] *The Ship under Steam*, by G. Gibbard Jackson (Fisher Unwin, 1927).



P.S. "COMET" (1811–12)

From a model in the Science Museum, South Kensington Crown copyright

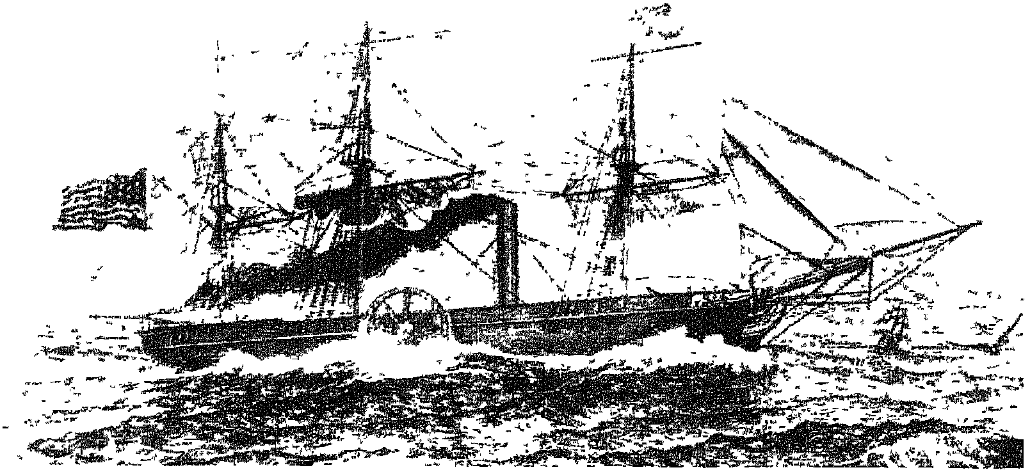
Back in New York Fulton, inspired by Symington's experiment, built the *Clermont* and fitted her with engines and boilers from the firm of Boulton and Watt, in Birmingham. Early in 1807 the *Clermont* opened the world's first regular passenger-steamship-service between New York and Albany. A United States stamp of 1909 shows her on the Hudson with an Indian birch-bark canoe and the *Half-moon*—the first canoe, first sailing-ship, and first steamer to sail on that river, though not the first steamboat on American waters, for that honour belongs to John Fitch's ill-fated steam-powered, oar-driven boat built in 1787. The *Clermont* was paddle-driven, and with her twenty-horse-power engine covered the distance of 150 miles, plying as a pleasure-steamer between New York and Albany at an average speed of five miles an hour.

Meanwhile Henry Bell, who had also seen Symington's steam-tug and kept up a correspondence with Fulton, had been busy, and by 1812 had built the first British passenger-steamer, the *Comet*, a pleasure-boat which carried passengers between Glasgow and Helensburgh on the Clyde, where he had a hotel. The original engine is now in the Science Museum, South Kensington, though the original cylinder—the principal part of the original engine—is in the galleries at Kelvingrove, Glasgow. The engine of the *Comet* developed four horse-power, measured five feet in height, and was built in a brick housing in the middle of the boat. She was forty-two feet long and eleven feet broad, and her speed, like that of the *Clermont*, was five knots. A modern internal combustion-engine developing the same horse-power, such as that fitted to a motor-cycle, would measure as many inches in length as the *Comet's* engine measured in feet. She made her first trip from the Broomielaw, Glasgow, in August 1812, and Bell, who knew how to advertise both himself and his ship, persuaded the more adventurous of Glasgow's society to admire the elegance of her furnishings with "their handsome carpeting—sofa—tassels, fringes, and velvet cornices ornamented with gilt," and to undertake the trip down the river. She must have looked a queer craft, with her absurdly long pipe-stem belching smoke, and one can imagine the dry comments of the craftsmen who were building wooden sailing-ships on Clydeside. Was there one among the crowd who cheered and jeered at this "tin kettle" to realize that it was a ship of destiny? Though from a commercial point of view she was not a success, the *Comet* was the foundress of practical steam navigation in this country; and it was steam that eventually defeated the American competition. Yet had America had the engineering skill and the iron works at this time the future of steam navigation would have passed into her hands. Henry Bell, after a life of speculation and enterprise, died in 1830, eking out his last days on a pension and charity.

Before Bell was in his grave David Napier had supplied the engines for the *Rob Roy*, built by Denny of Dumbarton, for the Glasgow-Belfast service, and in 1826 he supplied engines developing 200 horse-power for the 160-foot-long *United Kingdom*, which Steele had built. The first steamer to cross the English Channel was the Denny-built paddle-steamer, *Marjorie*, which was launched at Dumbarton in 1814 and later maintained a regular service between London and Margate. In 1819 a 'portable' steam-engine was put on board the sailing-ship *Savannah*, sailing between New York and Liverpool. This single-cylinder engine worked paddles that could be hoisted on deck when not in use. The *Savannah* made the crossing in twenty-nine days from New York to Liverpool. A similar fitting of a single-cylinder engine driving collapsible paddles was placed on the *Enterprise* shortly afterwards, and she made the voyage to India round the Cape.

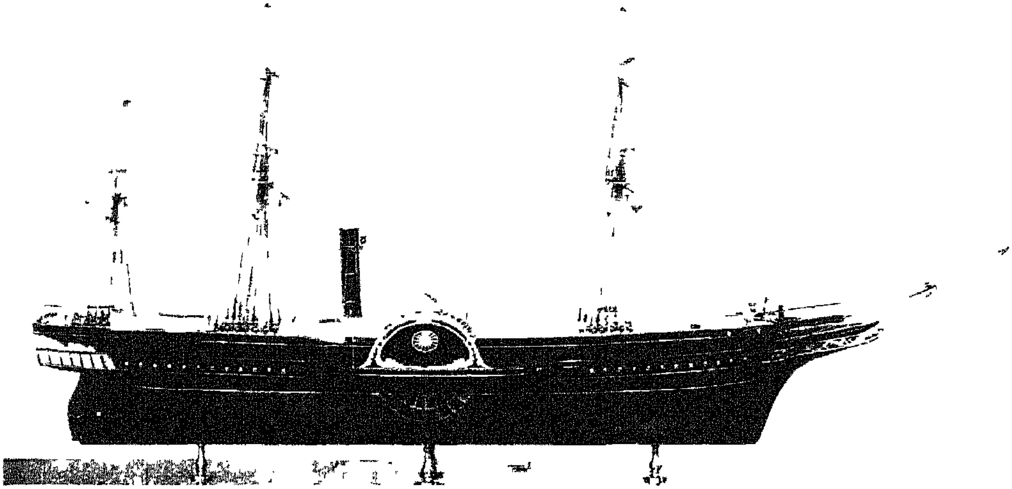
The Iron Ship

Captain Charles Napier, R.N., pioneered the iron ship by financing the construction of the *Aaron Manby* in 1821. These "dangerous vessels" built of iron were the appropriate home for the steam-engine, but mountains of prejudice blocked progress. From time immemorial ships had been built of wood. Iron would sink; wood would float. This conflict between the old school, building with wood, and the new, building with iron,



P.S. "SAVANNAH," 1818

By courtesy of the Science Museum, South Kensington



A MODEL OF P.S. "BRITANNIA," THE FIRST CUNARDER (1840)

From a model in the Science Museum, South Kensington Crown copyright

was dramatized in *Milestones*, by Arnold Bennett and Edward Knoblock. But demonstration that a vessel built of half-inch iron gave more cargo-space than one built of twelve-inch oak, that it was handier in the water and therefore more economical, that it was far safer from the perils of fire, thus appealing to the pockets of the underwriters, and that it was less likely to break up and founder in case of grounding or collision, settled the matter.

But the craftsmen of the wooden ships saw their livelihood in jeopardy, and their mockery was not unmixed with fear. If iron ships were to come then the shipyards must move to the neighbourhood of the coal and the foundries. It was the end of the little village concerns all round the coast wherever there was room for a cradle to build by the shore and wood within easy reach. It was the beginning of big shipyards, and proximity to enormous sources of coal for iron-making and of iron-ore was obviously and logically the determining factor of their site. Some of the older titles of shipbuilding concerns are functional enough to express this association. The "—— Shipbuilding and Iron Company, Ltd.," often occurred. Clydeside, Tyneside, and the Durham coast owe their industry of shipbuilding to being close to the coal- and iron-fields. Belfast and Thames-side imported their plates or the ore to make them. Their natural siting on sheltered waters and the ready supplies of labour, and in the case of the Thames the tenacity of tradition, favoured their establishment.

It was Robert Napier, cousin of David, who became the more famous of the two, both as designer and builder. He redesigned the ship's hull to offer less frictional resistance to the water, insisted on a high standard of materials and craftsmanship, concentrated on the steam-yacht, and so increased speed that the *Fire King*, built in 1846, reached 16 knots. The East India Company commissioned him to build for the Bombay service the *Bernice*, while on the Thames building for them was the *Atlanta*. Taking up the implied challenge, he had the reward of seeing his Clyde-built steamer on her maiden voyage beat the *Atlanta* by eighteen days.

It was Robert Napier, working in partnership with Sam Cunard, a native of Nova Scotia, who started the mail service between England and America; the pioneer ship of their fleet engaged on the regular service was the famous *Britannia*, though actually the *Unicorn* came before her, only she was not on the regular service. This brave little *Britannia* paddled across the Atlantic in July 1840 with sixty-three passengers and entered Boston harbour to the welcoming boom of cannon, having made the crossing in 14 days 8 hours. Her return trip she completed in just over ten days. This initial voyage was the forerunner of a regular monthly service, maintained by the *Britannia* and her sister-ships *Acadia*, *Caledonia*, and *Columbia*, sailing from Liverpool under the house-flag of the British and North American Royal Mail Steam Packet Company. The steamship was no longer the sport of the incredulous. She had arrived. The present-day *Queen Mary* or *Queen Elizabeth*, with all their majesty of size, power, and speed, look back to this pioneer ship which they could stow away as easily as luggage, and their red Cunard funnels with their black tops and black lines on the flanges wear the same proud sign as the little *Britannia* of a century earlier.

The Peninsular Steamship Company, which held the mail contract between Falmouth and Gibraltar and established the parent fleet of the P. and Q. Line, had as early as 1830 begun to use auxiliary engines on their sailing-vessels and more and more came to rely on steam instead of the winds. But one of the first pioneers of the steamship was James MacQueen, who was neither shipwright nor engineer but "traveller, journalist, statistician, Fellow of the Royal Geographical Society, and one of the fathers of ocean steam-navigation—founder of the Royal Mail Line." He it was who severely criticized the transport of mails under the Admiralty in the so-called 'coffin brigs' based on Falmouth, and in 1839 a Royal Charter was granted to the Royal Mail Steam Packet Company at Southampton. In the following year, the year when Rowland Hill's penny post was introduced, the Government concluded contracts for the carriage of the mails by private enterprise, and MacQueen secured the service to the West Indies and the Spanish Main. His order for fourteen steamships was of unparalleled magnitude and unchallengeable evidence of his faith in the steamship. One of the first "large steam-vessels" was the paddle-steamer "*Forth*, launched at Leith, which was 245 feet long, had 225-horse-power engines, and was 1285 tons burden." She was the first steamship to cross the Atlantic to the West Indies and sailed on her maiden voyage on December 17, 1841.

The Introduction of the Screw-propeller

At that early date the great majority of steamers were paddle-driven, and in the search for speed inventors experimented to find a more efficient form of propulsion. The introduction of the screw-propeller was chiefly due to the researches of three men: Frederick Sauvage in France, Francis Pettit Smith, an English farmer who amused himself by constructing clockwork-driven ship-models which he sailed on the Hampstead ponds, and the Swedish Captain Ericsson, whose patent was adopted in the United States. He revolutionized the engine-room of the American river-steamer when he built the *Iron Witch* in 1845, which, though a financial failure, was a pioneer ship.

Preliminary efforts towards a better mode of propulsion, however, had been going on since 1770, when James Watt suggested a "spiral oar." In 1785 Joseph Bramah was granted a patent for a method of ship-propulsion by "a wheel with inclined fans or wings," to be fixed on a spindle at the stern. In 1802 John Shorter, of Doncaster, demonstrated a method of screw-propulsion, driven by man-power for sailing-vessels when becalmed. In 1804 Robert L. Stevens, in America, was carrying out experiments with both single and twin screws. Trevithick, Millington, Lowe, Whytock, Perkins, and Samuel Brown all worked on the idea, but steamship companies continued to fit new ships with paddle-wheels.

For ten years Sauvage experimented at Boulogne harbour, involving himself in debt, for which he was imprisoned; while he was in gaol two rogues stole his drawings and sold his invention. On his release in 1839 Sauvage had the mortification of seeing at Havre the *Napoleon*, a French Government vessel, propelled by his own screw.

Failing to get redress, he died a broken man. How many inventors have suffered a similar fate! But the French erected a statue to him at Boulogne harbour.

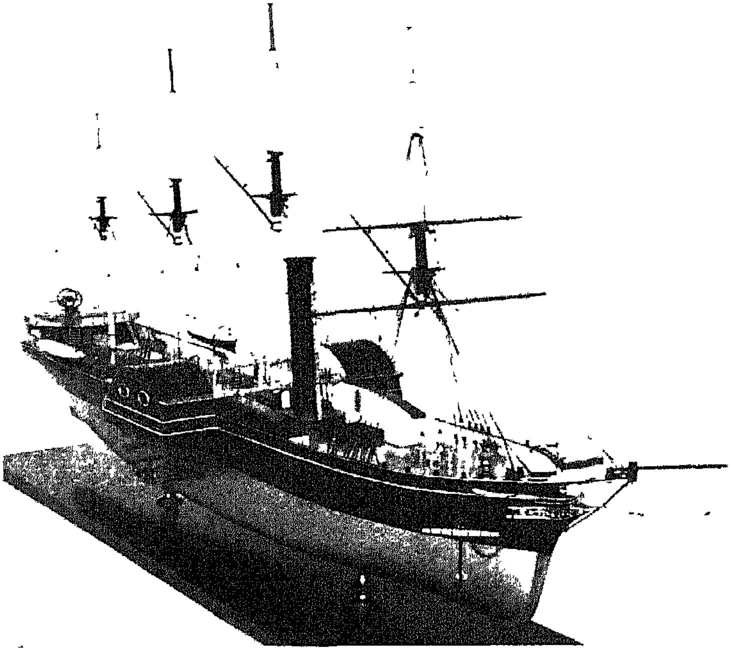
James Pettit Smith was more fortunate. In 1836 he took out a patent for a screw-propeller, and with Rennie's assistance founded the Smith Propeller Company. His device was fitted in 1838 to the little Thames-built steamer *Archimedes*, which sailed round Great Britain. Its performance so impressed the great engineer Brunel that he persuaded the Great Western Railway Company to change its plans for the ship then building at Bristol, and so the *Great Britain* had the honour of being the first screw-fitted Atlantic steamer. Pettit Smith was knighted in 1871, and his portrait hangs in the National Maritime Museum, at Greenwich. Ericsson received honourable mention in the navy records of the United States, though he lost his fortune over his experiments, but Sauvage found a pauper's grave. His actual first screw is, or was, in the Paris Museum of Technology.

The sceptical British Admiralty eventually agreed to the construction of a screw-driven ship, H.M.S. *Bee*, in 1842, and arranged a series of many trials to test the efficiency of this new propelling device. The most dramatic of these was that between the 900-ton and 200-horse-power H.M.S. *Rattler*, fitted with a screw, and the paddle-steamer, H.M.S. *Prometheus*, a ship of similar tonnage and power. This trial took place on August 24, 1844, and the upshot was that the *Rattler* beat the *Prometheus*, the former's screw driving her at 9·89 knots against the paddler's 8·89 knots. Next the Admiralty arranged for the *Rattler* to try her strength against the *Alecto*. Stern to stern in a tug-of-war, the *Rattler* dragged her struggling adversary away at a speed of nearly three miles an hour. The evidence of these trials established the superiority of the screw over the paddle.

Brunel and the Steamship

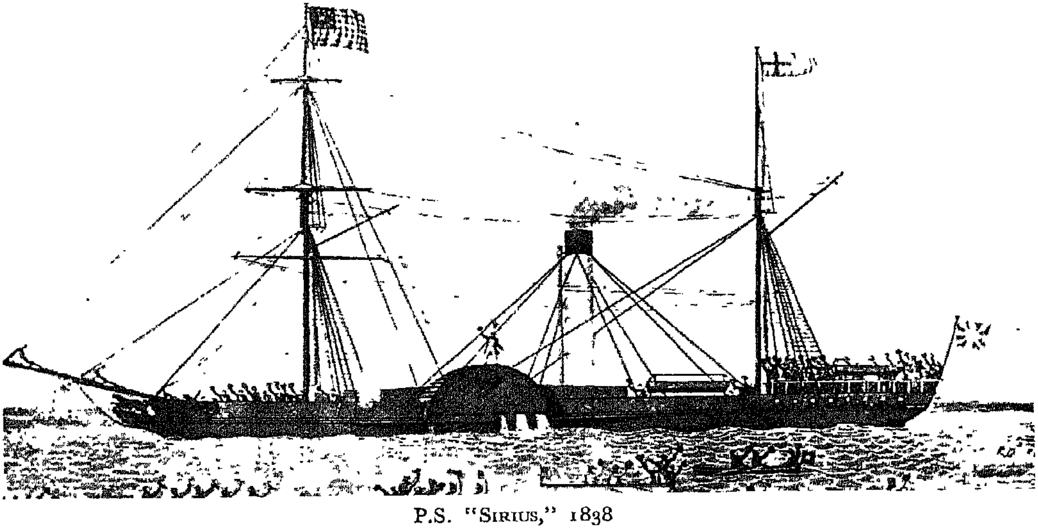
In the annals of engineering the name of Brunel is justly famous, and his contribution to railway progress was only matched by his work in marine engineering. Isambard Kingdom Brunel, the son of Sir Marc Isambard Brunel, a Frenchman by birth, had an English mother—a racial mixture that often breeds brains and sometimes genius. With his father he was responsible for the Thames Tunnel. He selected the route and built the Great Western Railway from London to Bristol and from Bristol to Plymouth, and he designed the Clifton Suspension Bridge, a single span of 702 feet. When in 1835, at a meeting of the G.W.R. Company, at Radleigh's Hotel, in Bridge Street, Blackfriars, one of the members present spoke of the enormous length of the proposed railway from London to Bristol, Brunel exclaimed, "Why not make it longer, and have a steamboat to go from Bristol to New York, and call it the 'Great Western'?" The whole company laughed at the preposterous idea. But Brunel was not joking, and he got his way.

The distinguished firm of Bristol shipbuilders, Patterson and Mercer, were charged with the building of the Great Western. It was argued that it would be quite impossible for a steamship to traverse the distance without refuelling. But Brunel was confident



P.S. "Great Western" (1837)

From a model in the Science Museum, South Kensington. Crown copyright



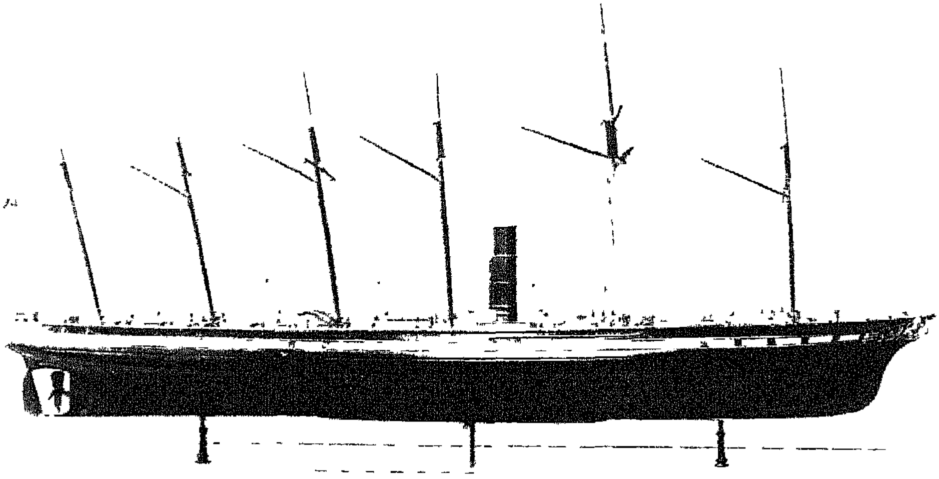
P.S. "Sirius," 1838

By courtesy of the Trustees of the National Maritime Museum, Greenwich that she could. Her engines were fitted in London, and as she lay anchored in the Thames she was "crowded with visitors, who were astonished at her magnificent proportions and stupendous machinery." After an unfortunate start—Brunel nearly lost his life while fighting a fire which broke out on the return to Bristol from London—the ship was ready, and she left Bristol for New York on April 8, 1838. When she arrived fifteen days later on the afternoon of April 23 she had consumed only three-quarters of her fuel—a fine testimony to the sufficiency of Brunel's calculations.

Meanwhile Liverpool was bidding for the honour and the rewards of the conquest of the Atlantic, and the enterprising American, Junius Smith, who had promoted his British and American Steam Navigation Company in 1837, started the building of the *British Queen*, named in honour of the young Queen Victoria, who had just ascended the throne. Owing to the bankruptcy of her Clyde engine-builders, the vessel could not be completed in time to try conclusions with the Bristol steamship. Undaunted by disappointment, and in the face of opposition, determined to keep faith with the public, who had been promised the service of the *British Queen*, he chartered the little paddle-steamer *Sirius*, and loaded every inch of her available space with coal, and she sailed out of the Thames and put into Cork according to the advertised schedule of the *British Queen*. On April 4, 1838, this little ship set out on her Homeric journey across the Western Ocean. Commanded by Lieutenant Roberts, a naval officer, she buffeted her way through heavy seas and roaring winds, her crew threatening mutiny on this apparently suicidal run, and on the morning of April 23 she sailed up the Hudson river, having burned all her coal and everything combustible on board. What an acclamation of welcome she received! The tiny *Sirius*, not much bigger than a Mersey ferry-boat, had steamed across the Atlantic and got to New York first. During the afternoon of the same day the *Great Western* arrived. Her conquest was the more decisive, for not only had she covered the distance in three days shorter time, she still had a quarter of her fuel in hand. The *Sirius* made one more Atlantic crossing and then went on to the London-Cork service, for which she had been designed, becoming the mother of the City of Cork Steam Packet Company. She ran till June 1847, when she was wrecked in Ballycottin Bay, sailing from Dublin to Cork. Her adventurous commander took over the *British Queen*, now completed, and then her sister-ship, the *President*. It was on March 12, 1841, that he sailed on the homeward voyage in his new vessel with a hundred and thirty-six passengers on board, and little did the watchers realize, on the New York water-front, as she faded like a black smudge on the horizon, it was a voyage of doom. The ship was never heard of again. How many brave ships and gallant men have been lost in this fog-bound, iceberg-ridden ocean!

The "Great Britain"

Encouraged by the success of the *Great Western*, the G.W.R. decided to lay down a second ship, and accepted the recommendation of Brunel to build her of iron and later to adopt the screw-propeller instead of paddle wheels. In this second ship, which was to be called the *Great Britain*, Brunel undertook a four-fold experiment. He was designing and constructing a steamship larger than any that had yet been built, in a material that had only just been used in shipbuilding for the first time and not on a large scale; he was adapting it to a new form of propeller which previously had only been used in an experimental steamer; and he was introducing marine engines of a greater size and of a character totally different from any that had been used hitherto. When she was planned and built the *Great Britain* had six masts: early in her career the number was increased to seven, but at a later date she had five, six, and finally four masts. She was built in a dry dock, but her floating was unsuccessful. Owing to a slight miscalculation by Brunel of a few inches in the curve of the sill of the dock, when the lines of her bilge were altered with the alteration from paddle to screw machinery, she was jammed by one inch. But it made all the difference, and twelve months passed before she could be released. She was floated out in December 1844 and took her maiden voyage from Liverpool to New York on July 26, 1845, making the passage in 14 days 21 hours—the first iron-built, screw-propelled steamship to cross the Atlantic. In 1852 she made her first voyage in the Australian gold-rush trade. Sold in 1882 to Antony Gibbs, Sons, and Company, she was converted into a full-rigged ship. She hogged the seas till 1886, when she was wrecked off the Falkland Islands.



A Model of S.S. “Great Britain,” the First Screw Steamer to cross the Atlantic (1846)

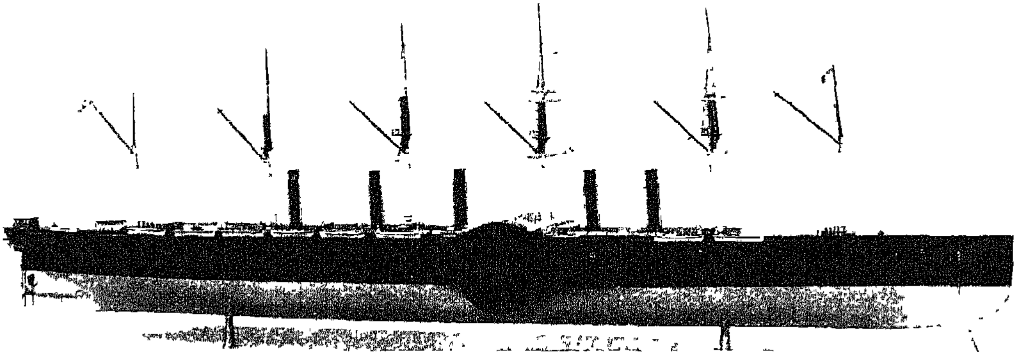
From a model in the Science Museum, South Kensington Crown copyright

The *Great Western* and the *Great Britain* demonstrated the validity of Brunel's contention that

> to make long voyages economically and speedily by steam required the vessels to be large enough to carry the coal for the entire voyage, at least outwards and, unless the facility for obtaining coal at the out-port was very great, then for the return voyage also, and that vessels much larger than had been previously built could be navigated with great advantage from the mere effect of size.

The "Great Eastern"

Brunel had designed two ships for the Australian Royal Mail Steam Navigation Company, and now he turned his mind to the working out of an idea for "a great ship," which would make possible the rapid conveyance of passengers, troops, and freight between England and Australia and India. With this purpose he began the design of the *Great Eastern* for the Eastern Steam Navigation Company. From the year 1852 until his death in 1859 Brunel supervised every detail of the design and working of the great ship, even to instructions in her management and the duties of the chief engineer.

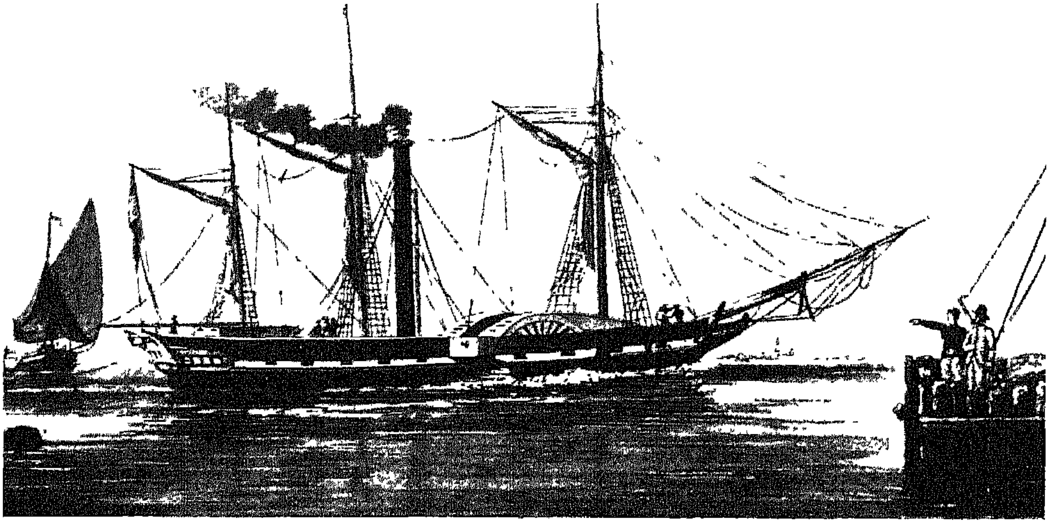


THE "GREAT EASTERN" (1858)

From a model in the Science Museum, South Kensington. Crown copyright

> I have [he said] never embarked on any one thing to which I have so entirely devoted myself and to which I have devoted so much time and thought and labour, and to the success of which I have staked so much reputation.

Work was commenced in the spring of 1854, and progress was eagerly watched by the general public and men of science. In the mammoth-to-be newspapers and periodicals found front-page news, and—as happens to-day—many exaggerated rumours circulated as to her expected achievements. The ship was 680 feet long and 83 feet in the beam. Her gross tonnage was 18,915—the largest ship of her day. She had accommodation for 4000 people, and was truly a wonderful production of her time. An innovator too with her novel, longitudinal construction and double bottom. She was fitted with sails, paddle-wheels, and a propeller, and was planned to do the trip to Ceylon without coaling. But the *Great Eastern* was never used in the service for which she was intended. That was via the Cape to Colombo, and she was there to distribute her cargo and passengers, among various smaller vessels running to India, Australia, and the Far East. The colossal expense of getting her into the water ruined the original company, and she was sold for a comparatively small sum to the Great Eastern Steam Navigation Company. She was put on the American service, for which she had not been designed and was so dogged by misfortune as never to be a commercial success. Nevertheless, it was her size and steadiness that led to her being commissioned to lay the Atlantic cable in 1865. In the words of the President of the Royal Institution at the time, the *Great Eastern* was "the most gigantic experiment of the age." Her end was ignominious, for in 1886 she was sold for £25,000 to be used as a floating fair before she went to the breakers. Brunel did not live to see her final completion, but he saw enough to know that his conception of the future of large ships would become a triumphant reality. She remained the biggest ship till 1899, when the *Oceanic* was launched.



P.S. "Curaçao." 1826

By courtesy of the Trustees of the National Maritime Museum, Greenwich

Progress in the steamship had been as astonishing as it had been rapid. As late as 1835 it had been pronounced that a regular transatlantic steamer service was impossible, and it is a far cry from Fulton's *Clermont* and Henry Bell's *Comet* to the *Great Eastern*. The impetus towards the development of the steam-powered vessel came first out of the steam age in which it was born. Soon it was recognized that power independent of the vagaries of the wind would give a greater average speed, and, above all, would secure the regularity in sailings that was so essential in the transport of mails.

The volume of foreign trade was swelling, and improved communications became a first consideration. Ascending factory smoke in Lancashire, Yorkshire, and the Midlands was a sign that goods were being manufactured for which distant peoples were eager to pay if they could get delivery. The utility of the steamer for river and canal navigation—it is estimated that over three hundred steamers were sailing on American rivers and lakes by 1822—led to its use in coastal traffic, and these short sea routes gave experience of which designers and engineers were quick to take advantage, and which Governments thinking in terms of battleships could not afford to neglect. The British Admiralty and the Honourable East India Company actually ran steam-packets, and State subsidies nursed all the early experimental steamship services. By 1837 the Peninsular Steamship Company was maintaining a service to Gibraltar, and by the fifties the P. and O., which it had become, by short stages to Alexandria and then overland to Suez, and from Suez to Bombay, a regular steam-packet service. It is generally accepted that the first regular steamship line was the General Steam Navigation Company of London plying in the twenties between London and Margate.

But the real test was the Atlantic. If this could be conquered then the steamship was the vessel of the future. The American *Savannah,* fitted with lifting paddles, made the crossing in 1819, but she was only under steam for 80 hours. Was the *Sirius* the first ship to cross the Western Ocean under steam-power? It is often wrongly so accepted. The Dutch can claim this honour with the *Curaçao,* built on the Clyde in 1826, which crossed to New York in 1827, and this record is fully authenticated, log-book included; the *Royal William,* built at Quebec, left that port on August 4, 1833, and arrived at Gravesend under steam on September 11—another pioneer achievement. By 1838, with the notable crossing by the *Great Western,* the Atlantic was conquered. It was a problem now for the engineer to make the steamship pay its own way. That commercial necessity enlisted all the science and inventive ingenuity of the time into its service. The great steamship lines began to develop—Cunard 1838, R.M.S.P. 1839, and P. and O. 1840—and this resulted in keen competition to secure new inventions. The march towards efficiency which would make the steamship pay, and then drive the wind ship from the seas, had begun. Wood to iron and iron to steel, paddle to screw, and, above all, the development of the engine from a giant infant into an infant giant.

CHAPTER IX

EVOLUTION OF THE ENGINE

(1840 TO THE PRESENT DAY)

The First Marine Engines—The Compound Engine—The Triple-expansion Engine—The Steam Turbine—The Turbo-electric Drive—Some Applications of Electricity—The Gyro-compass and Echo Meter—The Diesel Engine—The Change from Coal to Oil-fuel—The Development of the Motor-ship—The Importance of Oil To-day—The Tanker—Merchantmen at War.

> The engine is part of the ship and the men part of the engines.
>
> EUGENE O'NEILL, *The Hairy Ape*

ECONOMY is always the ultimate target of the designer and inventor of the marine engine as of all prime movers. But economy is only true when it is one with efficiency. It embraces not only fuel-consumption in relation to a given power output but a hundred and one other considerations. Initial cost, reliability during sea-service, accessibility of working parts, cost of maintenance, size and weight of machine, serviceability of materials used are only some of the factors which are all important in securing a true economy. It took nearly a century of scientific application and experience, nearly a century of experiment and invention, of perseverance and faith, to bring the marine engine to its present efficiency as a power unit, and in this evolution the seagoing engineer has played no small part.

When in 1763 James Watt was engaged to repair a model of Newcomen's engine belonging to Glasgow University an unnoticed event had occurred which was to change a world, for it was his observations and his improvements on this simple machine that gave us the first real steam-engine. It was one of Watt's engines, placed by Symington in 1802 in his tug the *Charlotte Dundas*, that gave us the first true marine engine. It acted directly by means of a connecting-rod on the crank of a shaft carrying a single paddle-wheel at the stern. From such a humble beginning the triple-expansion, steam reciprocating engines, which until recent years propelled practically all ships—and even at the present time a great number are employed—were developed.

Fuel Consumption

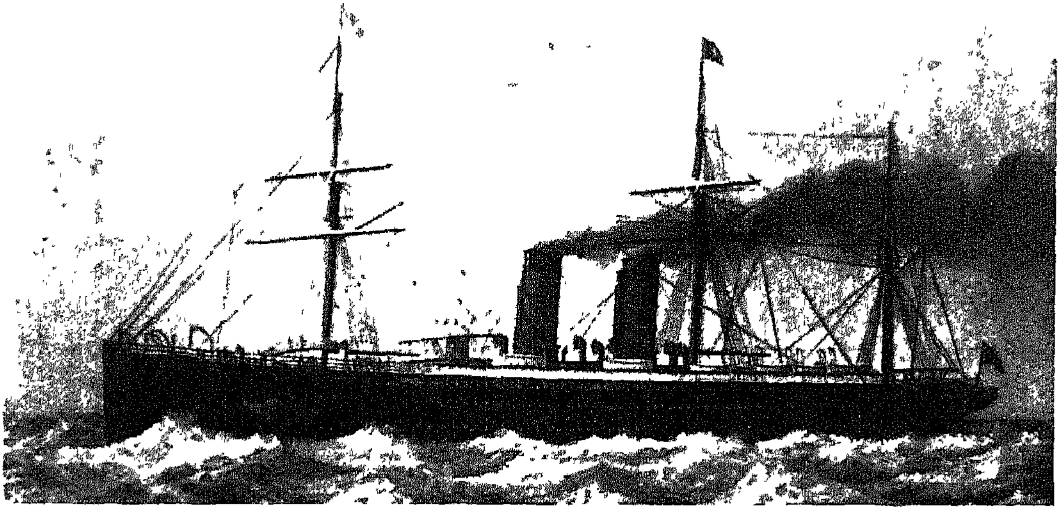
Fuel-consumption was the first line of attack, because all the early steamships were most extravagant. They were extravagant both in consumption and in labour, as well as extravagantly wasteful of their power potential. This was due to faults in both design and material. Boiler-pressures were as low as 5 lb. to 8 lb. per square inch, and even lower, and until these pressures could be raised the power output suffered. The excessive fuel-consumption was a serious matter because the amount of coal needed occupied valuable cargo space, and in consequence made freight rates costly. It was while the marine engineers were working out means of increasing the speed to offset the heavy running expenses—in other words, it was while the struggle was going on to make this power-producer more efficient and therefore more economical—that the sailing-ship enjoyed its richest harvest But there was the incentive to work. The steam-engined-propelled vessel had come to stay.

It was the steamship route to the East that presented the most formidable difficulties. This route through the Mediterranean depended on a chain of bunker stations for recoaling, and costly and slow transhipment across the Isthmus of Suez. The route round the Cape involved such a long journey, with constant recoaling in distant stations, that it put out of court the steamship as a competitor to the sailing-vessel. Brunel sought the solution in the Leviathan *Great Eastern*, but it was not the complete answer, for she still had to use the extravagant side-lever engine. The engine is the heart of the steamship, and until it became more efficient there could be no serious challenge to the sailing-ship.

The *Britannia*, of 1139 tons, could only do just over eight knots and burned 38 tons of coal a day; her bunker capacity was nearly three times her cargo space. Improvements in design and material, the change from wood to iron, and the adoption of the screw-propeller considerably improved these ratios and increased the speed, as a comparison of the figures of the screw, *China*, of 1861, with paddlers about the same time shows. The steamship was still handicapped by excessive coal-consumption in relation to the horse-power generated. By employing the simple, inverted engine the Cunard steamer, *Java*, in 1865 reduced her coal consumption in comparison with the *Britannia* by nearly half, and while the average speed of the latter was 8·4 knots the *Java*'s average was 12·8. Still her bunker capacity was as big as her cargo space. These dull, but nevertheless revealing, figures show the concentrated attention of marine engineers and designers to this question of increased efficiency.

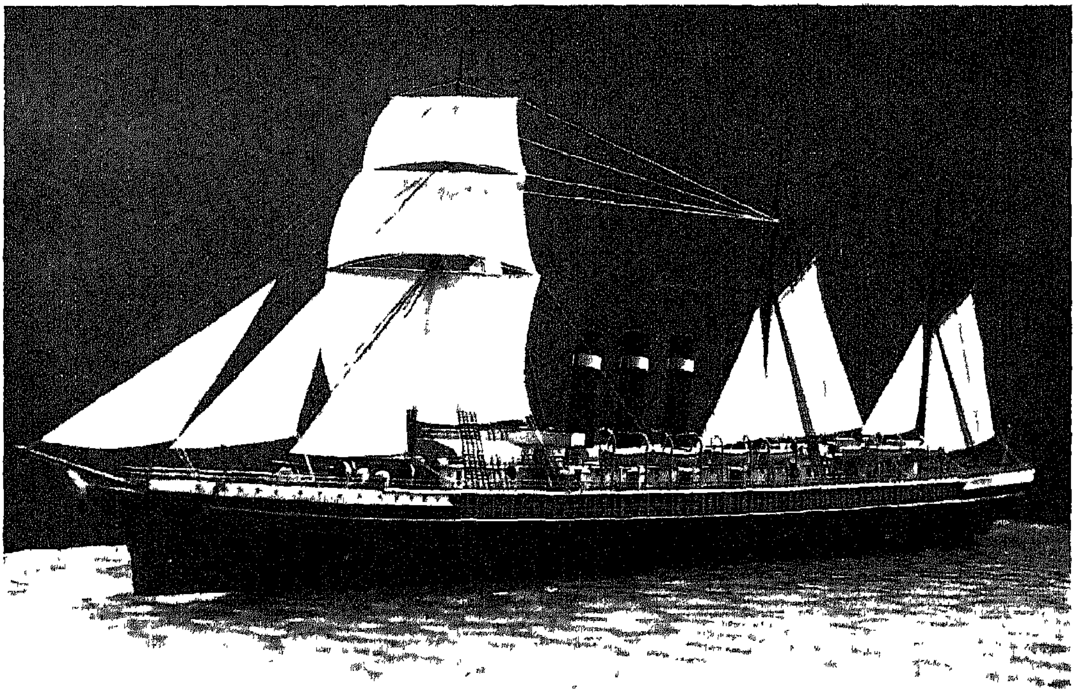
The Compound Engine

The introduction of the compound engine was a great advance on the simple oscillating cylinder engine. With the object of reducing the consumption of coal H.M.S. *Constance*, steam frigate, was in 1862 provided with six cylinders, and, though the arrangement was not very successful, this naval experiment not only marked the earliest example of a warship with a compound engine, but it pointed to the direction in which engine design was moving. Briefly, in the simple, single-acting engine the steam expands in the cylinder and pushes the piston the full length of its stroke. Its work done, the steam is let off through a condenser to be turned back into water, thus returning the piston to its position for the next stroke by a vacuum caused by condensation. This was the principle of Watt's engine. In the compound engine the expanded steam—which, by the way, is capable of 1700 times the expansion of its volume in water—is not let off into the condenser after its partial expansion but conducted into a larger cylinder, and this expansion lifts the next piston. The steam-pressure in the smaller cylinder is high to permit of the further expansion in the second cylinder.



S.S. "UMBRIA," 1884

By courtesy of Cunard-White Star Line



A WATER-LINE MODEL OF S.S. "CITY OF PARIS"

Photo Bassett-Lowke

It was the Holt Line, engaged on the important route between Europe and the North Pacific, which first fitted the compound engine to their steamship *Cleator* in 1863. Their problem was acute because coaling facilities were poor, and they were in competition with the sailing-vessels, which were free from this problem. When, however, in 1865 the Holt Line *Agamemnon,* fitted with the new compound engine, made a non-stop run from Liverpool to Mauritius of 8500 miles, it became clear that the steamship was on the way to conquering every distance. At that time no other power-driven vessel in the world could have done it.

By 1875 steamers of from 3000 tons to 5000 tons were proved paying propositions and had command of every route except the Australasian. As yet they were all driven by compound engines, though these had improved particularly through the connecting-rod engine, a form of steeple engine placed horizontally with two, and sometimes four, piston-rods. Between 1875 and 1880 the application of hollow, compressed-steel shafting, which reduced weight and increased durability and 'tandem' engines—that is, the placing of the two cylinders in line—resulted in a big gain in space. The sail was used as an auxiliary until as late as the *Umbria* in 1884. The inverted cylinder or 'steam-hammer' engine—so called from the way the cylinders were placed above the crank—was another space-saving development. The compound tandem was used in the *Germanic* and *Teutonic.*

Triple- and Multiple-expansion Engines

The company mainly concerned with the Australasian service was the Aberdeen Line, which had run the famous wool clipper, the *Thermopylæ.* Realizing the growing ascendancy of steam-power, they purchased from the Belfast shipbuilders, Harland and Wolff, a steamship for which Dr Kirk, one of their principal marine engineers, designed a triple-expansion engine—a continuation of the principle of the compound engine, working with steam under higher pressure so that the last ounce of energy could be used. The *Aberdeen,* which was launched in 1881, was a complete success. Coal-consumption was reduced from 2½ lb. in the prevalent compound engine to 1·28 lb. per indicated horse-power, and she completed the run to Australia with coal in her bunkers. In 1888 the Inman Line first fitted the triple-expansion system and the twin-screw to an Atlantic liner in their second, *City of Paris,* afterwards renamed *Philadelphia,* and with that vessel the first true steamship on the Atlantic service arrived. Sail was no longer an auxiliary and was only used in an emergency. The last two fine Atlantic liners fitted with triple-expansion engines were the *Campania* and *Oceanic II.* Steam reciprocating engines, with quadruple- and even quintuple-expansion systems, were fitted to some big liners in the bid for speed, but they never gave the satisfaction nor that smoothness of motion and rhythmic beat so characteristic of the triple-expansion engines. The fastest steam-reciprocating-engined liner ever built was the *Kaiser Wilhelm II,* which won the Atlantic Blue Riband in 1903. She had two distinct quadruple-expansion sets on each shaft, sixteen cylinders in all, and developed 40,000 horse-power.

The Battle of the Boilers

If we study the progress of increased steam-pressures from the first steam-engines of Watt, with 4 lb. to 5 lb. to the 90-lb. limit of the compound engines, and thence to the 300 lb. per square inch developed in the multiple-expansion systems, we realize that integrated with this advance is the progress of the boiler. The earliest boilers before 1868 were rectangular, not cylindrical. Then after the adoption by the Navy of the locomotives came the "Battle of the Boilers." This grand Parliamentary struggle against the conservatism of the Admiralty was led by Sir William Allen, M.P. for Sunderland—Belleville Allen, they named him in the North—and won for the water-tube boiler. There are many famous water-tube types now fitted—Belleville, Thornycroft, White, Foster, and others. In the new boilers steam-pressures were steadily increased, and the attention of the steel-makers was engaged to increase the tensile strength of the steels used in boiler-construction. Water-tube boilers have maintained pressures of 450 lb. and over for a decade.

Every development in engine-power created fresh problems, notably that of vibration, which is still the bane of the ship-designer. Vibration is due to a lack of balance, a lack of sympathy between the engines and the hull. One of the most successful methods of overcoming this trouble was in the lay-out of the engine cranks at definite angles in respect to one another according to the Yarrow-Schlick-Tweedie system.

The triple-expansion, steam reciprocating engine, with her 'Scotch' boilers, held unchallenged sway till 1897, when Sir Charles Parsons demonstrated the steam-turbine in the *Turbinia*, doing thirty-four knots at the Spithead Naval Review in that year. But the triple-expansion engine was not ousted. It still holds its place in spite of many challengers because of its reliability and low costs of maintenance.

> The crank-throws give the double-bass, the feed-pump sobs an' heaves,
> An' now the main eccentrics start their quarrel on the sheaves:
> Her time, her own appointed time, the rocking link-head bides . . . .
> They're all awa! True beat, full power . . .

Indeed, no other type of engine at present constructed can excel it in its simplicity, durability, and cheapness. But it has reached its maximum attainment, and in the demands for higher speed it has been left behind. It still serves in the ordinary, everyday cargo vessels, trawlers, and drifters—the general run of merchantmen of moderate tonnage and speed—and is favoured because it requires no specialized technique for its engineers. But operating engineers to-day are more highly trained, and fool-proof engines are dull engines to tend. These engines have the further advantage that all minor repairs can be done on board and major repairs wherever any decent-sized engineering works exist. Fast passenger and cargo liners cannot rest satisfied with the performances of the triple-expansion engine. The coming of the turbine finished the reciprocator for the express services.

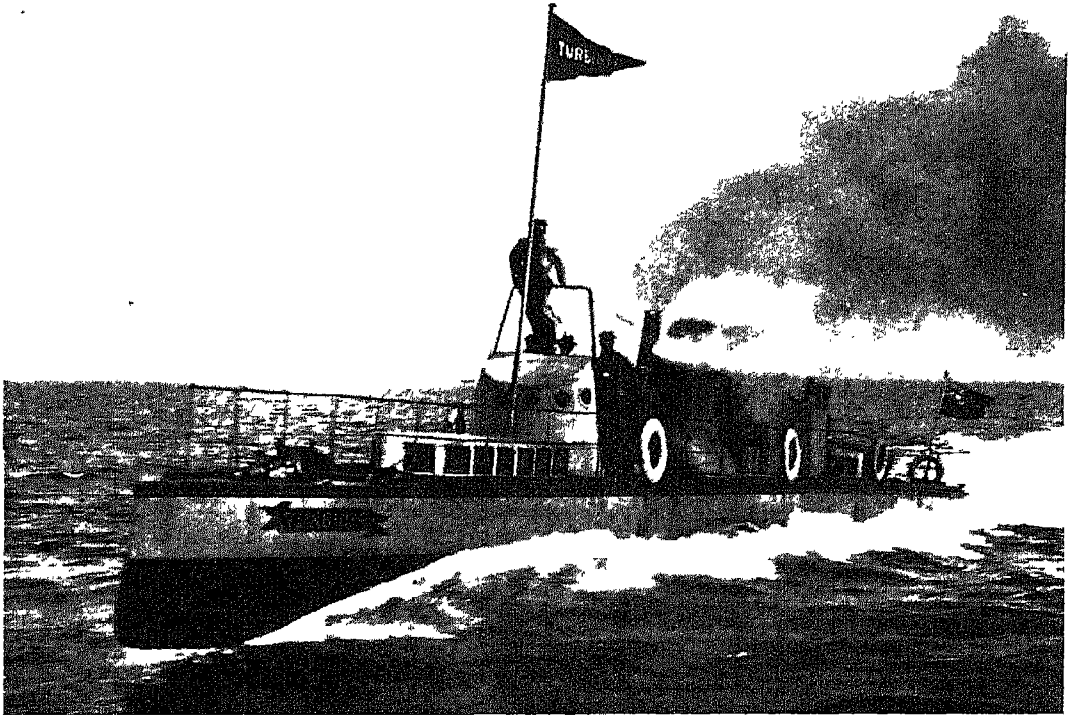
The Turbine-driven Steamship

A turbine-driven passenger steamer operating on the Clyde, the *King Edward*, was very popular, and did much to focus attention on this new method of ship-propulsion. To-day the turbine is by far the most popular drive for large powers and high speeds. Briefly, it is rotary in principle, a large rotor being rapidly revolved in a drum by the action of steam impinging on a number of circumferential blades. In Parsons' first model the turbine worked too well. The propeller spun so fast that it made a vacuum in the water, and the boat, instead of moving forwards, stood still. The advantages of the turbine over the reciprocator are greater fuel economy at high powers, fewer working parts, thus reducing the probabilities of breakdown, lower lubrication costs, an absence of 'thump,' and in the latest developments less vibration. The efficiency of the steam-turbine in the development of high speeds is witnessed in the fact that this method of propulsion was used in all the chief Atlantic greyhounds, such as the *Bremen*, *Europa*, *Conte di Savoia*, *Rex*, and the giant *Queen Mary*, and *Queen Elizabeth.*

For their great *Normandie* the French engineers adoped turbo-electric drive. The first turbo-electric steam-liner to be built in England was the *Viceroy of India* in 1929. The first liner to use turbo-electric drive was the American liner *California* With this system steam-turbines are coupled up to electric generators, the current being led to a main switch-board, from which, by means of cables, are fed the propulsion-motors which are coupled to the propeller shafts. The theoretical disadvantage of this system is the loss occurring in the conversion of power from electrical to mechanical, but the experience of the *Normandie's* engineers was that the loss of power was not appreciable. The advantages of the system were very great—economy of space in the best part of the ship, full power astern, instantaneous response in manœuvring, ability to switch power to any of the four shafts, elimination of turbine-blade trouble, silence, cleanliness, absence of turbine reduction-gear whine, and many others.

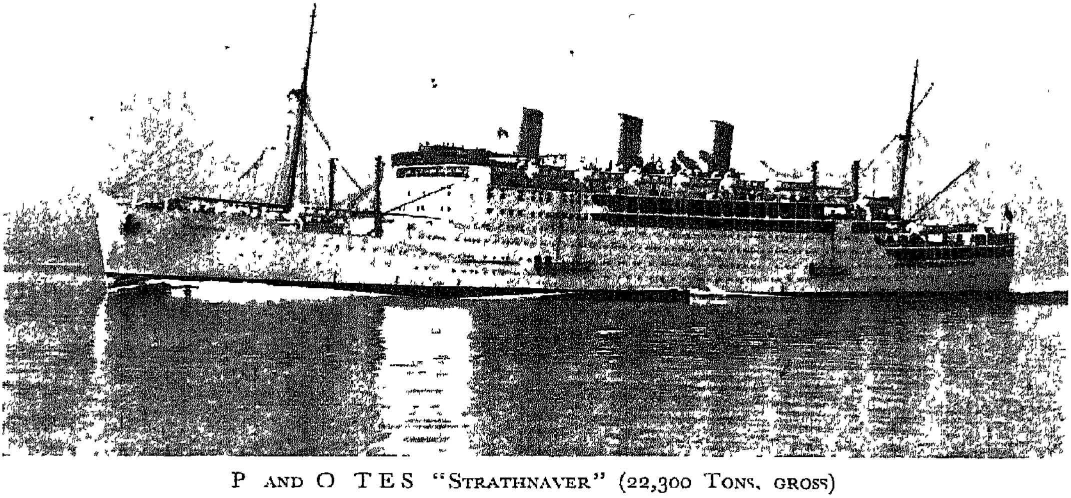
Turbo-electric Drive and the "Normandie"

The main propelling machinery of the *Normandie* consisted of steam-turbines with synchronous electrical transmission. The machinery was arranged over four lines of shafting, each driven by a three-phase synchronous motor. Each propulsion-motor normally derived its energy from one of the four main turbo-alternator sets. In conditions of maximum economy, and at the normal service speed, the machinery was designed for a total output of 130,000 shaft-horse-power. The fact that the relative positions of the generators and the motors were not strictly fixed gave considerable latitude for instalment. The turbo-generator sets were therefore placed close to the boilers, and the turbines mounted directly above their individual condensers, resulting in a great saving of steam-piping. The propulsion-motors were placed in a compartment aft, thus eliminating long lines of shafting. This separation of the primary and secondary machinery enabled the ship, in the event of a breakdown of a generator, to proceed with all her screws running.



T S. "Turbinia" at Speed

By courtesy of the Parsons Marine Steam Turbine Company from a photograph in the Science Museum, South Kensington

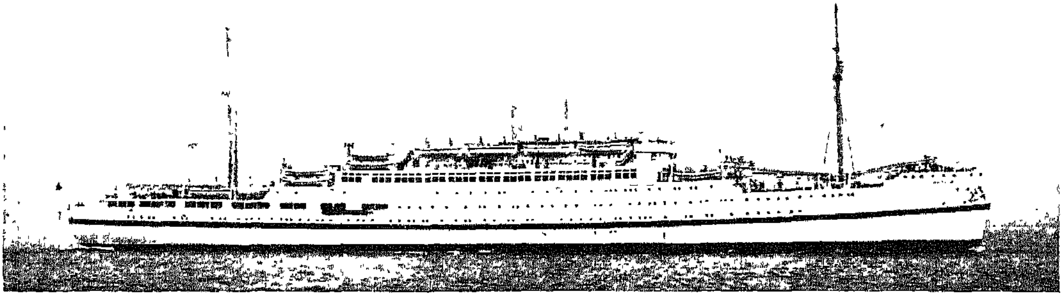


P and O TES "Strathnaver" (22,300 Tons, gross)

By courtesy of the P and O. Steamship Company

A popular misconception is that the turbo-electric drive creates vibration, and this probably arose because of the excessive vibration felt during the first few trips of the *Normandie*. The drawback of vibration has nothing whatever to do with turbo-electric power *per se*. In the case of the *Normandie* it was all traced to the design of the propellers and the propeller bossings.

The system of turbo-electric drive had been experimentally tried as early as 1907 in the German *Vulkan*, and in the American *Joseph Medhill* and *Graeme Stewart* in 1908, and it had passed beyond experiment into a recognized efficient method of propulsion in the famous U.S.S. *Jupiter* in 1913. This system has since made big strides in America, especially in the U.S. Navy. There is a sharp difference of opinion between those who favour the high-pressure steam-turbine and those who advocate the turbo-electric drive. It can be said that the *Normandie*, of much less horse-power than her rivals, had still a great reserve of speed never used in a crossing. Witness also the great speed of many of the U.S. Navy's capital ships with turbo-electric propulsion.



THE DIESEL ELECTRIC SHIP "PATRIA"

This vessel, the latest development in luxury liners, was built in 1939 at Hamburg for HAPAG for the service between Hamburg and the West Coast of South America.

Before the outbreak of war the Germans had also experimented with several Diesel electric ships, and in 1939 they built the *Patria*, the largest Diesel electric ship in the world. She was built by the Deutsche Werft at Hamburg for HAPAG for the service via Southampton and the Panama Canal to the West Coast of South America. She had a gross tonnage of 16,595, was 584 feet long with a beam of 73 feet, and had twin screw machinery driven by two 7500-B.H.P. electric motors, current-generated two M.A.N. Diesel engines.

The accommodation is of the highest class, with a First Class dining-saloon, on the promenade deck at the forward end, with a lounge adjoining so that the two rooms could be made into one for dances and festive occasions. A grill-room opened out into a veranda café overlooking the boat-deck.

It was on this ship that Grand Admiral Karl Doënitz signed the preliminary surrender of the German Forces in North-west Africa. She was taken over by the British, renamed the *Empire Welland*, and refitted as a troopship. She is a very attractive and well-designed ship.

The progress of the engine and of the ship had only been possible because of the progress of science. Social politics had early impressed themselves on thoughtful minds, and the beginnings of humanitarian reforms in the nineteenth century were an expression of the new movement towards emancipation. There was another influence that made itself felt about the middle of the century, and that was the wider interest in scientific investigation. The publication of Darwin's *Origin of Species* in 1859 began a new era. The atmosphere is now one of observation and analysis, an awareness of the need for specialized knowledge. It stimulated the passing of Forster's Education Act in 1870, and the "Mechanics' Institute" for adult education came into being. Social life was affected. Popular education was systematized, and science, once a closed book save to an elect few, was democratized. The man of science was no longer an academic recluse. He was, in the person of Huxley, a social and educational force. The applied sciences were encouraged by the industrialists, who quickly realized the advantages to be gained, and technical education became—as it still is—their chief interest. It is difficult to realize that in 1870 half the population could neither read nor write and that the public education of England lagged far behind other countries, far behind Scotland, where since the seventeenth century there had been a school in every parish. Improved education of the people meant greater efficiency, and it was out of no benevolent interest in culture that it was fostered. This indifference to culture stung Matthew Arnold to speak of the "Barbarians."

This awakened interest in the applied sciences resulted in a spate of inventions and especially in the field of electricity. Faraday's experiments in 1831 into the methods of inducing an electric current led to the invention of the dynamo. Before 1840 Wheatstone's electric telegraph had been installed by the Great Western Railway. By 1865 Field's cable was stretched across the bed of the Atlantic. Edison, in America, and Swan, in England, had invented an effective system of electric lighting by 1880, and a year later an electric power-station was opened in New York. The telephone had already been invented by Bell in 1876 and improved by Edison into a serviceable instrument. Before 1900 the London underground railways were electrified, and in 1901 Marconi wirelessed a word across the Atlantic.

Electricity in the Ship

All this progressive invention directly influenced social life and just as directly influenced the ship and her men. Complicated mechanisms require skilled attention, and seamen become artificers and specialists. The engine-room takes precedence, and technical training becomes essential. Electricity became a vital source of ship-power, employed first as an auxiliary and now in the turbo-electric drive as a prime mover. It is the source of light and abundant energy on all modern vessels. It drives the deck machinery, the windlass and capstan, the pumps and fans; it works the motors of the gyro-compass, the echo sounder, the radio installation and direction-finder, and controls the steering. The refrigerating machinery is electrically driven, and so too is the air-conditioning plant. Indeed, there is scarcely one activity in the modern ship where some form of electrical energy is not used, and it is true to say that nothing has contributed more to safety at sea.

The Gyro-compass

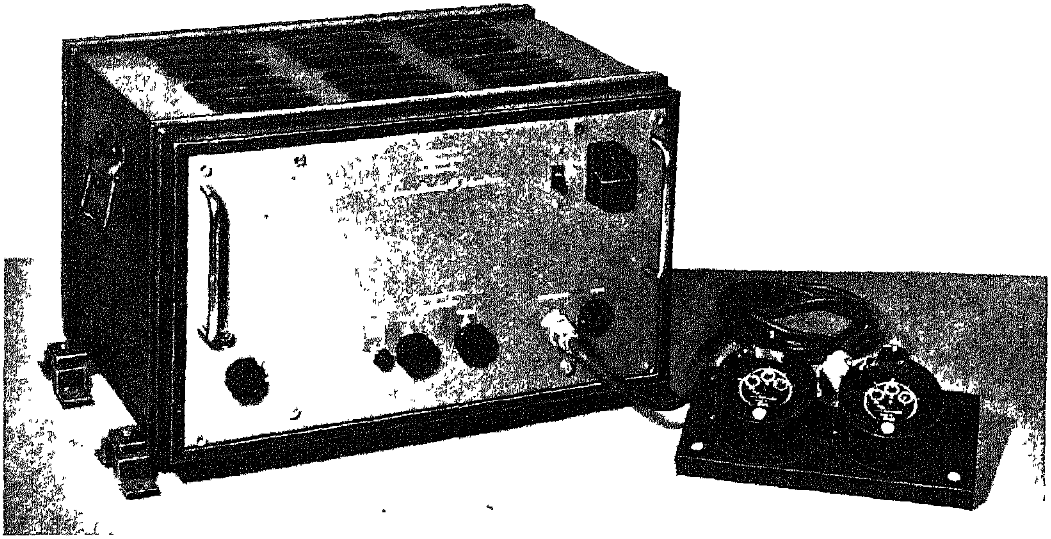
One of its recent applications is in the gyro-compass. This differs from the magnetic compass, in which the needle takes up its position under the influence of the earth's magnetism, in that the gyro-compass takes up its definite position under the influence of the earth's rotation. Since the earth's magnetism is variable, and the earth's rotation is constant, the gyro-compass is the more accurate. The earth's axis lies exactly through the poles, and the gyro-needle always indicates very closely the true geographic meridian. The gyro is maintained spinning at speeds of from 6000 to 30,000 revolutions a minute, usually by a three-phase electric motor. Both magnetic compasses and gyro-compasses take time for their oscillating needles to settle in position, but the gyro, instead of minutes, takes hours to come to rest. That is why, in practice, it is usual to set it by hand. The directive force of the gyro-compass is so strong that it can be made to control electrical contacts which will operate secondary compasses. These secondary, or repeater, compasses, controlled by the master compass, can be fixed and will work in any position, and a steering repeater can be arranged so that the helmsman looks directly at it, and not, as with a magnetic compass, down into it. As the gyro-repeater clicks with every yaw, or variation of a sixth of a degree from the ship's true course its characteristic clicking is the helmsman's guide.

The Echo Meter

Up-to-date ships are all now fitted with an echo meter, an instrument which in the past ten years has completely changed the methods of finding depth and location at sea. The old methods of sounding with a weighted line were quite impracticable on fast liners. They could only be used under favourable conditions. The echo sounder can make as many as five hundred soundings a minute. It is revolutionary in the sense that it does not use an outside agency, such as a measuring-cable, but uses as a connecting link between the ship and the sea-bed the water itself. It works on the elementary principle of timing sound. As the velocity of sound in sea-water is known the time interval between the emission of a sound and the reception of its echo from the sea-bed enables the depth to be determined. In the bottom of the ship a special transmitter is placed and also a receiver. Both are electrically connected with a recording instrument on the bridge. This permits a range of electric current to send out a series of sound impulses from the transmitter of a very high frequency inaudible to the human ear which travel down to the sea-floor and are reflected back as echoes. These echoes are picked up by the receiver and the impact of each returning echo, amplified and relayed to the bridge, moves an electric pen or 'stylus,' and the graph it records on the band of paper moving slowly beneath it shows the changing depths and adds to our information about the sea-bed. From these recordings we have a graphic picture of the submarine mountains and valleys over which the ship is sailing

The Decca Navigator

One of the most recent, and in some ways the most revolutionary, devices is that further development of radar navigation known as the Decca system. It has been used operationally only by the Admiralty. This Decca Navigator, to give its full title, is radically different from radar technique, which is based, generally speaking, on short-wave pulse transmissions interpreted on a cathode-ray by a skilled operator. The Decca device employs continuous, unmodulated long-wave transmissions which operate direct-reading meters. It is a system which supersedes the age-old methods of arriving at a ship's position at sea and enables a pilot of a vessel or aircraft to sail a dead-true course and know under any conditions of weather or visibility his exact position. By its aid ships were enabled to navigate safely the tortuous channels between the minefields during the war, and barges made landings on the Normandy beaches under the most difficult navigational circumstances with a margin of error that could be calculated in yards. The principle on which the Decca Navigator works is simple. Its power is derived from radio transmission. Now, radio waves travel



THE DECCA NAVIGATOR

The ship model is for permanent installation and works off the ship's mains The numerical readings on the two dials, red and green, and the relation of these to a special chart, gives the precise geographical position

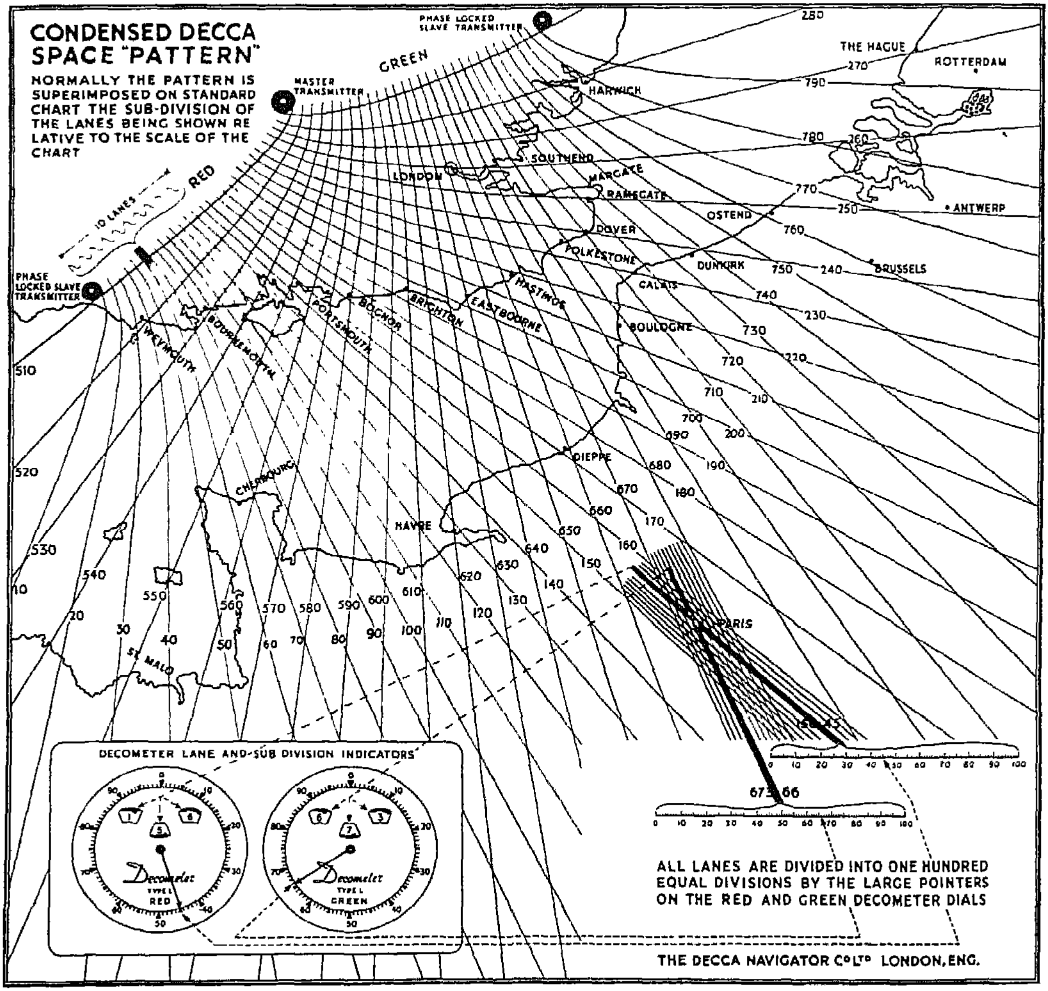
By courtesy of the Decca Navigator Co , Ltd , London through space in a series of ever-widening rings. If, therefore, two or more synchronized radio transmitters are placed at fixed distances their etheric rings will intersect, and so a space pattern results. This space map, or pattern, charts at each point of intersection an exact position—a position unaffected by winds, tides, or polar attraction.

The Decca Navigator uses two dials, and these are set to the reading of the chart given at the point of sailing. When the vessel puts out, like the minesweepers on D-day, the navigator is switched on. Every pin-point position on the chart is marked by the intersection of two ring lines. The course through the space pattern is steered accordingly by the dial readings. This dial indicator is called the Decometer. Working charts have appropriately coloured lines, all of them numbered. The space between two adjacent lines is called a 'lane.' These lanes are indicated on small dials while the Decometer indicates on its large-calibrated dial to the accuracy of hundredths of a lane. Since this Decometer is unaffected by outside interference its readings are dead-accurate. With one Decometer dial registering on the red line and another on the green the navigational position of ship or aircraft read off the space pattern is charted with positive certainty, and the pilot knows just where he is. Used in conjunction with radar, which informs the operator of the position and character of surrounding objects, and is thus an invaluable guard against the risks of collision, the Decca Navigator makes a great step forward in scientific devices securing safety at sea. It is as easy to work as a domestic radio-set and just as portable. Provided suitable radio transmitting stations are erected it will be operable all over the world, and it is equally accurate at long range or near the transmitters, whether on sea or in the air. One experimental run has been made to 1100 miles showing accurate readings. This Decca system, devised by the Decca Company and the Admiralty Signal Establishment, has passed beyond the experimental stage, and its specialized war-time service may become the general peace-time practice when suitable transmitting stations have been erected, securing an accuracy of navigation beyond the ability of all other methods.

Radar Development

British scientists investigating the future of radar navigation in merchant ships have now made discoveries enabling the feat of 'blind' navigation to be not only possible but practicable. Sea history was made when a vessel, H.M.S. *Pollux,* on January 23, 1946, turned into the congested shipping lane of the Thames Estuary, navigated entirely by radar. The bridge was deserted, officers had left the compass, the echo sounder was switched off, and there was no look-out on this 'blind' run. A chart-comparison unit aligned against the screen of the radar set gave the ship's position. A new type of reflector fitted to buoys made it possible to distinguish their different types, and increased the range at which they could be detected from two to ten miles. By the aid of these improved radar reflectors the buoys arranged in easily recognizable geometrical patterns stood out sharply on the screen in clear contrast to the illuminated dots signifying ships. Every detail of the throbbing life of the Estuary was reflected on the radar screen. H.M.S.

Pollux on her trial run was able to thread her way through the river traffic at ten knots. This demonstration of helm orders given from the heart of the ship, cut off from all ordinary vision of the outer world, points to an end of the fog menace especially in busy, restricted waters. At present the new radar set is regarded as an aid and not a substitute for normal methods of navigation. It is a good story that is told of an officer watching through his glasses the Normandy landings. In great excitement he telephoned down to the radar-control room "Hell! You don't know what you're missing. You ought to be on the bridge." A gruff Scottish voice replied from the bowels of the ship, "Dinna' be fasht! *We've got a far better view doon here.*" Electronics, or the science based on



CONDENSED DECCA SPACE PATTERN

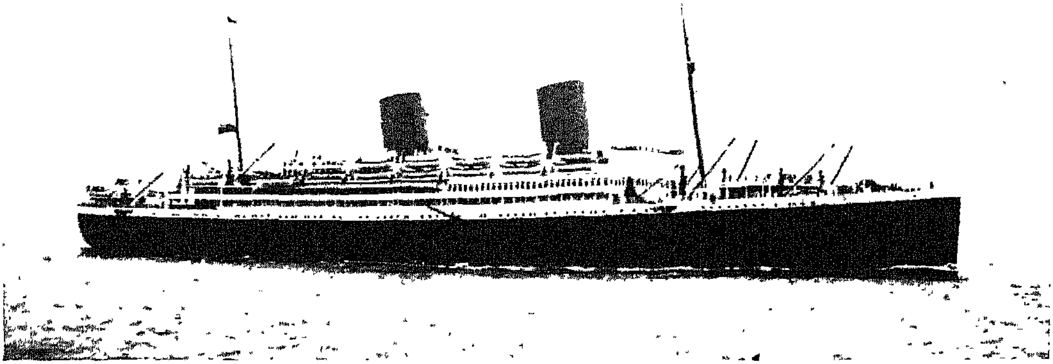
By courtesy of the Decca Company, London employing the properties of thermionic valves, of which radar is only one development, is still in its infancy, but it is a swiftly growing science with great research possibilities and a wide variety of applications both in shipping and industry.

Apart from the outstanding achievement of the atomic bomb, the scientific development which contributed most to the winning of the last war was radar. It was of incalculable help in the Battle of Britain. It was invaluable as an air interception device and later as a submarine detector. A sudden and remarkable drop in our shipping losses in May–July 1943 followed the installation of the system in Coastal Command machines. Fog and night navigational difficulties were considerably reduced, and it undoubtedly saved our two finest passenger liners, the *Queen Mary* and *Queen Elizabeth*. Its adaptation to peace-time use on merchant and passenger ships is of paramount importance and is receiving immediate attention. The time is not far off when the apparatus will have been so simplified that all ocean-going ships will be able to use it. The latest development of radio direction-finding, perfected by British technicians from the German system called *Sonne*, used extensively for long-distance navigation by enemy submarines, has now been set up at Bushmills, Northern Ireland. This Console Radio Navigation System works automatically and operates throughout the twenty-four hours, and ships within a range of 1500 miles over sea will be able to fix their bearings within sixty seconds by tuning in to the 1140-metre band, listening for the code signal, and then counting the dots and dashes during the next sixty seconds. Though the North Atlantic route is the first to be covered, it is only a question of time before Console stations are built to serve every ocean highway.

The mind of man is restless, ever searching for something new. It was inevitable that when the triple-expansion steam-engine had come to all intents and purposes to a full-stop that marine engineers should explore the possibilities of other forms of propulsion. There is truth in the American's remark that "new ways are better than old ways, even though they be just as good." It is the refusal to mark time, to rest satisfied, that is the secret of progress. The advance of science has fostered this restlessness, for by increasing man's material resources it has transformed modern life. Ruskin sarcastically observed, "Wherever we are, to go somewhere else, whatever we have, to get something more." But this is a myopic view, stressing the incidental and overlooking the essentials of scientific achievement. Every fresh addition of human knowledge is at once destructive as well as constructive. The immediate effects are disturbing, until after a while when the old landmarks have gone new landmarks appear on the horizon. Meanwhile the currents of life are accelerated, and, with augmented resources in material things, we get more opportunity for the true enjoyment of living. The mental unrest that quests for more and more invention to transform our physical environment evokes a spiritual unrest that seeks the answer to what purpose?

The Internal-combustion Engine

It has been said that the most revolutionary invention of modern times was that of the internal-combustion engine—an invention that a distinguished contemporary, reflecting on the dreadful uses to which it has been put, said it were better that it had never been born. All the most terrible weapons of modern war—the tank, the aeroplane, the submarine, the high-speed motor-craft among them—are driven by this means. Invented about 1885 and first developed by the Germans and French and applied to the motor-car, first by Gottlieb Daimler, its potentialities as a method of ship-propulsion began to excite the interest of engineers. It was the invention of the Diesel engine, named after its inventor, Rudolph Diesel, which burns heavy oil such as American and Russian petroleums, having a flash-point above 73° Fahrenheit, which made the idea practicable. The Diesel uses no plugs and fires by compression. Many difficulties were experienced at first, especially those of excessive vibration and wear and tear.



R.M.S. "Alcantara" (22,200 Tons)

This ship and her sister ship R.M.S. "Asturias," built by Harland and Wolff in 1926 for the South American Service, were originally motor-driven, but in 1935 they were converted to steam-turbine drive.

By courtesy of the Royal Mail Lines

By 1910 the first seagoing motor-ship, the *Vulcanus*, fitted with a six-cylinder, four-cycle Werkspoor engine rated at 320 brake-horse-power, was built at Amsterdam. In this country the early Glen liners pioneered the Diesel engine. There were heart-breaking troubles in the early motor-ships, fractured cylinder jackets, seized pistons, cracked bearings, and such wear and tear that it was next to impossible to keep engines running for prolonged periods. But the advantages in valuable space saving were so great, and the incentive to improve this new form of propulsion so strong, that its progress during the last thirty years has been marked enough to finally doom the old reciprocating engine.

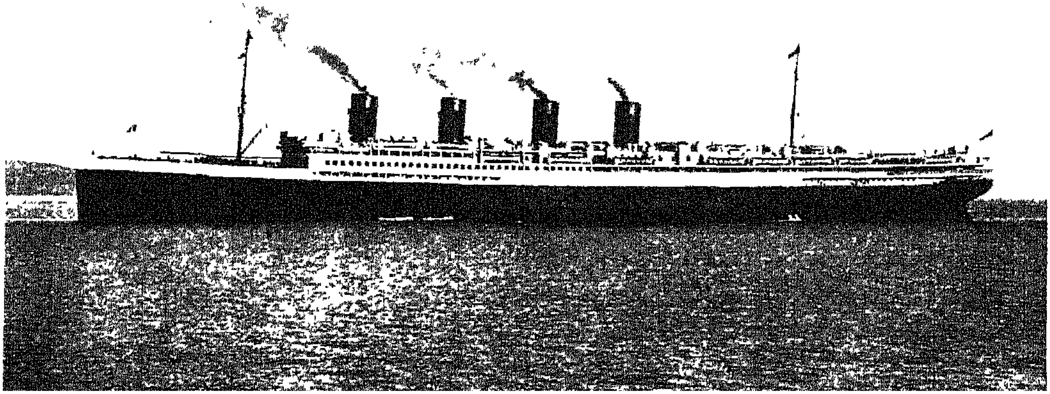
Motor-ships

On the matter of space occupied it can be demonstrated by a comparison between a five-horse-power motor-cycle engine with a piston about the size of a cup, and which only stands about 20 inches high by 14 inches wide and 8 inches through, and a steam-engine developing the same power. Harland and Wolff built the *Asturias* in 1926 for the South American service of the Royal Mail Lines, but as she did not attain the expected speed she was later, together with her sister-ship, the *Alcantara*, converted to steam-turbine propulsion. Since then many fine motor-ships have been built in this country, chiefly for the Union Castle and White Star Lines. The largest all-British motor-vessels, with a tonnage of over 26,000 tons, are the Cunard-White Star liners, *Britannic* and *Georgic*, though the *Georgic* has now been sold to the Admiralty as a permanent trooper. The Italians built a number of big motor-liners, chief among them being the 32,000-ton *Augustus*, the largest and highest-powered motor-ship in the world, and the *Victoria*, which was credited with reaching a speed of 23½ knots. Though the Diesel engine is outpaced by the turbine drive, it has come to stay.

Before considering some of the main advantages of this type of engine another important change affecting all big express passenger and cargo ships must be noted, and that is the turn-over from coal-burning to oil-firing. While we still have many hundreds of modern cargo ships of about 10,000 tons burning coal, oil fuel is used almost exclusively on all the large passenger liners and on many of the express cargo vessels. A modern Atlantic liner consumes about 6000 tons of fuel-oil in a single journey across the Atlantic. The superiority of oil-fuel over coal is firstly that it is clean to use, is easily stored, and it requires little labour. Secondly, it can be used in the anti-rolling tanks, with which many liners are fitted, in order to steady the ship in bad weather. But the salient factor in the use of oil in preference to coal on the fast modern liner is the facility with which it can be shipped. If such ships as the *Queen Elizabeth*, *Queen Mary*, or any of the giant liners at sea, could not turn round in the ports in a very few days they would not be able to make enough trips per year to yield any dividend at all. These ships can be bunkered and turned round in three days with enough fuel for the round trip. The *France*, in her coal-burning days, carried 260 stokers for her 24 knots, and 24,000 tons registered. The oil-burning *Normandie*, at 31 knots or more, and nearly four times the size of the *France*, carried only about 40 stokers. The *France* took days to clean after coaling. The oil-burner takes in her fuel with no more dirt than in taking her fresh water. The great disadvantage, apart from the cost, for the price of oil-fuel in this country is about four times the price of coal, is that the oil has to be bought abroad, and money must therefore go to purchase it until sufficient plants are installed in this country to distil it from coal. Our annual imports from the United States alone for petroleum amount to £40,000,000 as against £29,000,000 on food. One-fifth of our costs of the total estimated imports from the States is for petroleum.

In the modern oil-propelled motor-ship the fuel-consumption of the Diesel engine for a given power output is considerably less than in the steam reciprocating engine, while the necessary feeders are fewer. Here are two economies in costs and wages. Next the weight of fuel to be carried in a motor-ship is only about one fifth to one third the weight of fuel required by a steamer of equal power, which together with the decrease in the weight of the propelling machinery enables the motor-ship to carry more cargo.

As Mr John Lamb points out in his study, *The Running and Maintenance of the Marine Diesel Engine*, stand-by losses are eliminated entirely, and there is the welcome elimination of boiler-work and trouble attendant on all steam-engines after they have run some time. It is true that the efficiency and reliability of oil-engines depends almost entirely on the seagoing engineer, and this in turn depends on his skill and specialized knowledge, which have to be paid for; but if the machines are given the proper attention they are just as reliable and serviceable as the steam-engine. The efficiency and the economy of the oil-engine for long-distance ocean sailing was so soundly established by 1926 that the Blue Funnel Line after that date built no further steam-driven ships for their Far Eastern services. Their experience of the screw oil-engines, ordered from Burmeister and Wain, fitted in their ships was that after twenty years' continuous service they were still highly satisfactory. The saving in bunker and machinery space and the ready supplies of oil available for refuelling, together with the consistently good engine performance, more than justified the change over from steam- to oil-engines.



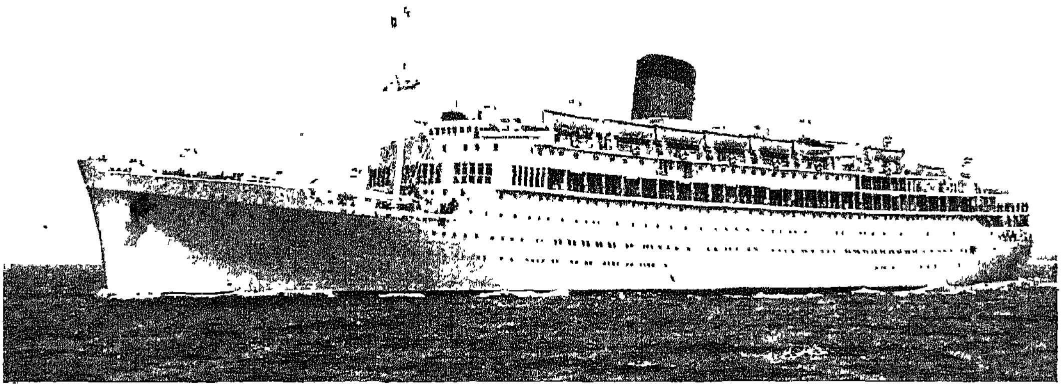
T.S. "FRANCE" (24,000 TONS)

This vessel was originally built with coal-fired boilers and later converted to oil-fired boilers.

By courtesy of the C.G.T. (French Line)

As yet, compared with the steam-engine, the marine oil-engine is young and is still capable of development. Therein lies its interest. Unlike the steam reciprocator it has not reached its maximum achievement. It employs higher pressures and temperatures, and these have created new problems for metallurgical science to explore. Of the high efficiencies and reliability which the Diesel oil-engine has reached and its capacity to stand up to the most exacting strains, no better illustration can be given than that of the Diesel-engined launches employed by the Navy's Coastal Service. These 72-feet motor-launches, used mainly for harbour defence and as 'maids of all work,' which are to be seen buzzing about the waters of every port, command good speeds and often have a considerable range. The small, high-powered fighting-craft capable of terrific speed and amazing manœuvrability are all petrol-fuelled. In the near future demands will be made of the power-driven vessel, in whatever class she may be found, that the steam reciprocator can no longer satisfy. If proof be needed of the success of the Diesel-engined motor-ship it is to be seen in the ever-increasing new tonnage at sea and under construction.

Research is now occupied with an exploration of the possibilities of the latest prime



T.S.M.S. "ORANJE" (19,900 TONS)

This vessel, a triple-screw motor-ship, was built by the Nederland Shipbuilding Company for the Stoomvaart Maatschappij (Netherland Royal Mail) in 1939 for service on the Amsterdam-East Indies service

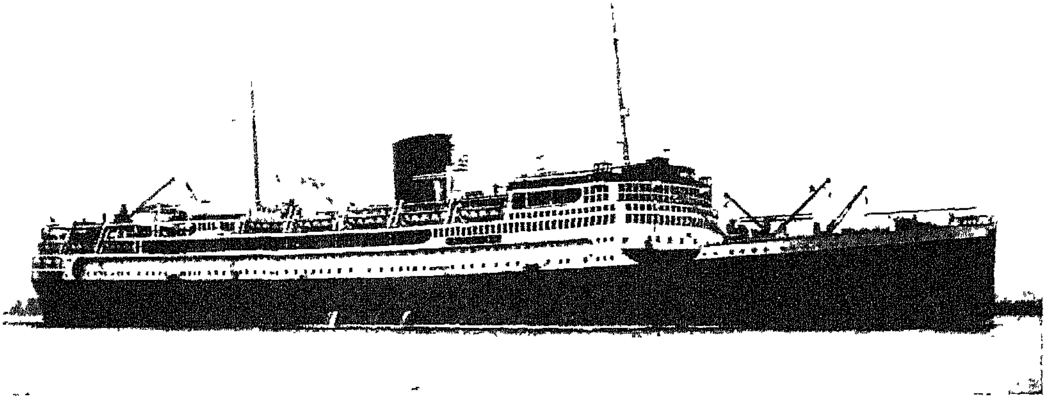
Photo by J. G. Van Agtmaal, Hilversum. By courtesy of the Netherland Royal Mail

mover—the gas turbine. The advances in metallurgical science have brought this new form of propulsion into the range of the possible and even the probable. In aeroplanes particularly a number of them have already proved themselves. This system eliminates all the intermediaries that stand between the heat energy created and the revolutions. It does away with boilers, condensers, fuel, and cooling water systems, and so enormously reduces both the weight and the valuable space they occupy. An oil-engine weighing over a thousand tons, if it were a gas turbine of similar power, would only weigh about seventy tons. Such a prospect must be attractive to the marine engineer and to the shipowner, but there is a tremendous amount of experiment, investigation, and scientific research yet to be done before this latest prime mover can be adapted to marine use. The latest jet aircraft are fitted with gas turbines.

Oil is of paramount importance in the modern world. The control and command of oil supplies is the preoccupation of statesmen in all countries. The modern war literally runs on oil. Without oil the internal-combustion engines which have revolutionized transport by land, sea, and air would stop. Through the war in Europe and in the Far East the first priority was the seizure or the destruction of the enemies' oil supplies, natural or distilled. Without oil the fighting and mercantile navies of the world would be paralysed. The world of the present has been revolutionized through the agency of the tanker.

The Tanker

The vast increase in the world's consumption of petroleum has resulted during the last quarter of a century in a huge increase in the world's tanker-fleets. These highly specialized types of vessels are the only ships which can carry oil in bulk. A characteristic feature of the tanker among large ocean-vessels is that it carries the ship's machinery aft. It is not unique in this respect. The Norwegians built large cargo-vessels designed to carry heavy weights after this plan, and there are some shallow-draughted small coasters with their engines aft. Ships of the United Molasses Company, Ltd., and the "Bel" fleet of crane ships operated by Captain Christen Smith, of Oslo, are built this way too. A tanker can carry 12,000 tons or more of liquid-cargo, which may be either 'dirty' —that is, boiler or Diesel oil, lubricating or gas oil—or it may be refined, like petrol, kerosene, and paraffin. They are expensive ships to build because of the character of their cargoes and the high quality of the workmanship which goes into them. It was the Isherwood invention of the longitudinal system of building that revolutionized the construction of the tanker-ship in 1907; and the bold policy of the Eagle Oil Transport

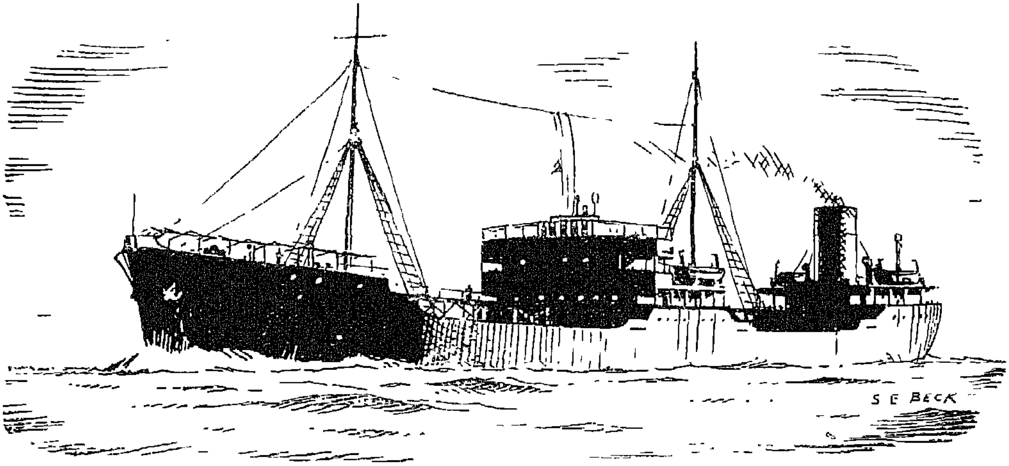


D.M.S. "BALOERAN" (17,000 TONS)

This vessel, with her sister ship the *Dempo*, was built in Holland in 1936 for the Rotterdam Lloyd service between Rotterdam and the Dutch East Indies.

Nautical Photo Agency

Company, Ltd., in ordering ten 15,000-ton tankers, of which the *San Fraterno*, 1913, was the first that laid the foundations of our tanker-fleet. They are mostly driven by Diesel engines, though steam-power is used on some. Tankers, because of their vital necessity in war-time, grow bigger and faster, and both Italy and Japan concentrated on this type of vessel for reasons the war has made clear. The average size of the modern tanker is about 18,000 tons, with a speed of about 12 knots, though the *Émile Miquet*, built in 1937, the largest tanker and cargo ship in the French Mercantile Marine, is a motor-ship of 30,600 tons displacement and has a speed of 14 knots. Before the war the Standard Oil Company was building ships of 18,000 tons dead-weight, and the average size of Swedish tankers, though not record-breaking, is very large. The Americans during the Second World War built a number of huge tankers, turbo-electric driven, with a speed of 16 knots.



AN OIL-TANKER

These ong and are built up to

The story of the tanker reaches back to the whale-oil days of the sailing-ship, when oil was carried in barrels and cases. The fear of fire kept this oil-trade away from the steamers. Sailing-vessels were then designed to carry it in bulk by fitting into them large tanks. This method was later adopted by the steamers anxious to share in this business, and in the seventies the Red Star Line entered the trade. American exports of oil continued to mount, and it was the German *Gluckhauf* and the British *Bakuin* engaged on the Batoum oil-service that pioneered the true tanker in 1884. So profitable was the trade that many dry-cargo ships were converted, and in 1892 the Shell fleet was founded. Every known device to increase the safety and the strength was adopted. The Eagle Oil Transport Company, Ltd., built the biggest tankers in the world, with their *San Fraterno* class, though they only had a speed of ten knots. The Dutch pioneered the motor-tanker in 1909 with the *Vulcanus*, and the French in 1914 built the first big motor-tanker the *Motricine*, of 4000 tons gross. The first Diesel electric tanker built in Britain in 1928 was the *Brunswick* for the Atlantic Refining Company. It was the Japanese who set the pace for very fast tankers with their famous *Teiyo Maru* in 1930, fitted with German engines doing seventeen knots, and this stimulated the American reply. The tanker does not come into competition with ordinary traders and carries no other cargo, and only after considerable alterations may she be used for transporting whale-oil, palm-oil, and molasses. She may, however, when adapted, carry grain, and during the war she was used to carry water and aircraft. In 1939 there were nearly 15,500,000 gross tons of motor- or oil-engines at sea.

In the great achievements of the Merchant Navy during the war the tankers have played a magnificent part. Millions are now familiar with the brave and ceaseless work of our ships and their men, thanks chiefly to three films—*Merchant Seamen*, *San Demetrio*, and *Western Approaches*—and to the war documentaries that have been published. Their battle had no respite: nine hours after the declaration of war the liner *Athenia* was torpedoed off the Irish coast. Aeroplanes, submarines, surface-raiders, minefields, as well as all the natural hazards threatened every sea-lane. The most bitterly attacked convoys were those trying to get through to Malta in 1942 when the Mediterranean was controlled by the Axis Powers, and at the same time ships were making the most incredible sea journey of 11,600 miles round the Cape from the Clyde to Suez. It took seventy warships to guard a convoy of thirteen merchantmen making for Malta, of which only five got through. The Arctic convoys were cruel and exacting in the waters of the storm and mid-winter gale. *Merchantmen at War*, a Stationery Office publication, tells their epic story. The tanker ice-locked each night so that her men could walk across the ice to other tankers; men adrift on rafts and in open boats for thirty days; icebergs, fogs, U-boat packs, low-diving Stukas; most dramatic of all the salvaging of the *Franche-Comte*, which, like the *San Demetrio*, was safely brought back to port with her 11,000 tons of oil after being torpedoed, set on fire, and abandoned. In all the annals of the Merchant Service there is no more tragically heroic a story of courage, suffering, and sacrifice than that of the terrible experiences of the tanker crew of the *San Emiliano*, which was torpedoed, set ablaze, and sunk in the South Atlantic.

"Have you news of my boy Jack?"
    Not this tide.
"When d'you think that he'll come back?"
    Not with this wind blowing, and this tide.

"Oh, dear, what comfort can I find?"
    None this tide,
    Nor any tide,
  Except he did not shame his kind—
    Not even with that wind blowing, and that tide.

Rudyard Kipling, *My Boy Jack*

CHAPTER X

INDIVIDUAL ENTERPRISE AND SOCIAL RESPONSIBILITY

(1850 TO THE PRESENT DAY)

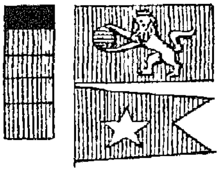
Famous Shipping Leaders—From Individual to Company Ownership—The Companies (Limited Liability) Act—Private Enterprise and Control—Examples of Self-government—Lloyd's Register, Shipowners' Associations—Samuel Plimsoll—Havelock Wilson.

> Is man an ape or an angel? I am on the side of the angels.
>
> BENJAMIN DISRAELI, speech at
> Oxford Diocesan Conference, November 1864

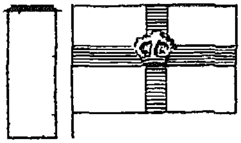
THE story of the steamship's development in Britain is one of individual enterprise, for it was not artificially fostered by State subsidies. The early merchants and shipowners were often actual navigators and shipmasters, and this continued until a century ago. Since then the shipowner has evolved as a specialist, with all the responsibilities of ownership-maintenance and replacing of tonnage, chartering and control—but it is worth recalling some of the names of the master-mariners who during the nineteenth century became shipowners.

John Clint, of Liverpool, who went to sea at twelve years of age, retired in 1822 owning several ships and became a founder of the original Liverpool Shipowners Association. Joseph Mondel, master-mariner, became the owner of a line of sailing-packets between the Mersey and South America; while Joshua Hargrove, commander of a Liverpool brig, founded in 1875 the firm of Hargrove and Ferguson, running forty ships. In 1870 they added their first steamers, *Dahlia* and *Crocus*, but their steamers were sold to the Harrison Line, though Hargroves continued to own sailers down to 1901. It was the Dumfries shipmaster, William Lowden, together with his brother Samuel and brother-in-law Captain Thomas Connell, who laid the foundations of the Athel Line of large tanker-ships, and it was another Dumfries shipmaster, John Houston, born in 1831, who, with faith in the new, iron ships, launched out in 1878 with the *Duncow*; and within a few years he owned the *Dundrennan* and *Dunstaffnaga*, and the four-masters, *Albyn*, *Brownrigg*, *Cawdor*, and *Ellisland*, which many an old ship-lover can still recollect.

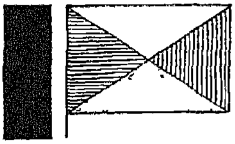
From the days of sail and through the days of steam the foundations of the shipping industry were truly laid by men of keen business ability. Many of them began when ships were run on sixty-fourth shares, with unlimited liability, in the days when a blunder or a misfortune meant ruin, and in the days before the telegraph, cables, and wireless gave owners control at overseas ports. The shipmasters had to act on their own initiative, attend to repairs or renewals in distant ports, to be sensitive to the pulse of trade, to be *au fait* with the fluctuations in the money world, and to be alive to every opportunity. There is much of romance in the biographies of the great leaders who have built up the British mercantile marine.



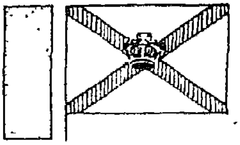
Cunard-White Star Line



Orient S.N. Company



P. and O. S.N. Company



Royal Mail Lines

Famous Shipowners

There was Arthur Anderson, a Shetland beach-boy, with his partner Brodie Wilson, an insignificant London shipbroker, who began the great P. and O. Line—a group that to-day is one of the most important shipping combinations under any national flag. There was Samuel Cunard, of Halifax, Nova Scotia, an owner of sailing-ships running down the North American coast, who hazarded all his assets at the age of fifty in the founding of a steamship company to sail the Atlantic. With George Burns and Donald McIver he brought the North American Steam Packet Company into existence, and his name is now honoured in the name of the world-famous company with an enviable record. There was Donald Currie, a poor Greenock lad, who, after gaining experience with Cunard, was fired with ambitions of ownership, and founded in 1872 the Castle Line to challenge the monopoly of the Union Steamship Company on the South African service. This latter company sprung from the humble origins of the Union Steam Collier Company. These two competing rivals amalgamated in 1900 under the title of the Union Castle Steamship Company, and the young Greenock clerk lived to see himself chairman of this great combine. There was MacQueen, who opened the great career of the Royal Mail. There was William Inman and Hugh Allan, who drove the sailing-packets with their wretched steerages off the Atlantic, invading the emigrant service with the fine Inman Line and Allan Line steamships. There was Frederick Leyland, a pioneer of modern methods in Atlantic shipowning, founder of the Leyland Line. And there was James Lyle MacKay, first Earl of Inchcape, who became the ruling figure of the great P. and O. group, and Lord Kylsant, chairman of the Royal Mail group, who began as an office-boy.

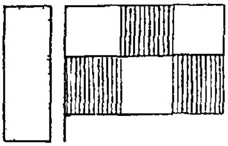
The tramp shipping industry, a product of the industrial progress of the century, had its pioneers. Walter Runciman, first baronet and first Baron Runciman, the first to adopt, in spite of the opposition of the insurers, the Doxford-turret type of ship started in 1885, with one second-hand ship. In ten years he was operating twenty-five steamers, founded the Moor Line, and by 1914 owned forty steamers. There was James Knott, who founded the Prince Line, and William Joseph Nobel, first Lord Kirkley, who founded the Cairn Line. These were both eventually absorbed in the famous Furness-Withy group, whose controlling figures were Christopher Furness, afterwards Baron Furness of Grantley, and Edward Withy. John Reeves Ellerman, first baronet, started life as an accountant's clerk, and his insatiable appetite for business not only made him the controller of the Ellerman Lines but of many other ventures. There was Sir Edward Nicholl, Sir William Reardon-Smith, Sir Edward Hain—these are only a few of the shipowners who, by character, enterprise, and ability, built up great concerns. Indeed, practically all the great shipping businesses of yesterday and to-day, in both hemispheres, owe their existence, and often their names, to the individual genius of their founders and controllers.

The State must always employ the services of such outstanding leaders. In shipping this is particularly true, for not only has it strong individualistic traditions, it needs the freedom and flexibility of individual direction. But to say that the way to prosperity is to return to the nihilistic individualisms of the nineteenth century is both false and foolish. We cannot put the clock back if we would, and we would not if we could.

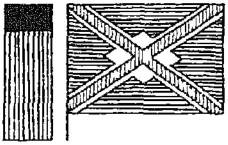
The nineteenth century estimated the shipowners of the day according to their fortunes, and by that test they were acclaimed. The figures, as disclosed in their wills, show that the Red Ensign did not float in vain. Lord Inchcape left £2,125,000; Lord Runciman left £2,500,000; Sir Robert Paterson Houston is credited with £7,000,000; Baron Furness "owned over 30,000 acres and was patron of seven livings"; while the Ellerman estate, which covered a wide range of financial interests besides shipping, was finally sworn in September 1936 at £36,684,944, exclusive of certain property in the United States and Canada. Admitting that the State took a heavy toll, and that many charitable institutions benefited, it is an imperfect society that regards money as the only tangible ideal.

In his informative little book, *The Ship You Will Command,* Mr John P. Taylor gives the biographical outlines of some of the famous shipowners, together with this statement of their fortunes, as examples for aspiring young cadets to emulate. To include their millions seems to appeal to selfishness in attainment. It is an attitude commonly held both in this country and America that success is measured by the amount of riches amassed. This admiration for wealth in private possession is anti-social. It conceives society not as a community in which all co-operate for the good of each, but as a field for exploitation to secure economic power. There was, if not deliberate cynicism, in this anarchic individualism a striking application of the materialistic nineteenth-century philosophy of the primacy of the economic function. "Enlightened self-interest" it was euphemistically called, which, being translated, meant, "Devil take the hindmost." This conception differed from the moralized feudalism which thought in terms of hereditary privilege. Neither property nor culture but income was the common measure of man's world.

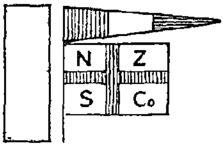
This attitude created a vulgarity of outlook in the obsession for gain which accounts for all the miserable features that blot its record. This worship of income persistently emphasized the power of money, and as only 5 per cent. commanded it the ghost of the caste system haunted society. The whole community was carefully segregated into classes based on income. It was money at any price—fair means or foul. The history of the century is honeycombed with financial rogueries—bank failures, company failures, gambling in a get-rich-quick scramble—that in self-protection legislative financial reforms had to be enacted. Among these one of the most important was the Companies (Limited Liability) Act of 1862.



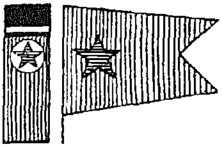
Canadian Pacific Steamships



Union-Castle Mail S.S. Company



New Zealand Shipping Company



Blue Star Line

Group Ownership

The continued expansion of the shipping industry, together with the building of bigger and more costly vessels, made great demands on capital resources—such demands that even the wealthiest private individuals found exacting to meet. The Merchant Shipping Act of 1854 had gone some way to solving this problem of finance by recognizing group ownership. The interest in every British ship was divided into sixty-four parts, and any number of these parts or the whole issue could be registered under one name. This permitted an association of individuals to share in the cost of building and running a ship, and to designate its management to one among them with shipping experience. Often it was a family concern. Sometimes it was a shipbuilder, broker, merchant manufacturer, or marine-stores dealer who combined to run the ship for their mutual benefit. Often the private, provincial, and joint stock banks advanced the money, but at high rates of interest to its borrowers. The trouble came when, owing to bad times, the interest on the capital borrowed from the banks could not be paid. In the stress for ready money economies were pressed beyond the limits of safety for the ship and its hands, and wages were depressed. Men were discharged, and then followed the miseries of unemployment. It was the story of the whole industrial world. Slump and boom, the cycle of supply and demand, the fat and the lean years, and all the while the manipulations of the speculator and swindler. It would be unjust to blame the bankers, brokers, and industrialists for causing these miseries, but their continued recurrence is inseparable from the worship of the blind god of profit.

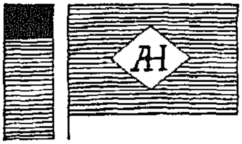
Limited Liability Companies formed

The Companies (Limited Liability) Act of 1862 was designed as a protective measure against the crooks and as a security for the investor. It broadened the basis, and in a measure altered the character, of investment. Now the investor knew that at the worst he could only lose the money he had put into the firm, and not, as before, be mulcted for claims he could not anticipate. The investors' liabilities were fixed, and creditors could not claim on his other assets. This Act made possible the modern development of industry in general, and of shipbuilding and shipowning in particular. For now no longer was the circle from which capital could be raised confined to a small class of wealthy men, or to a group of enterprising, interested partners mortgaged to the banks. Anybody with surplus means could take up shares and become shareholders. This encouragement to the small investor to offer the use of his small money as capital for an undertaking meant that it tapped a new source of money, and now there were immense reserves of money available for the development of enterprise that seemed likely to make good profits. From the standpoint of creating the necessary capital to meet the demands of an expanding and progressive industry this measure was a good one. The share capital of the great shipping lines of to-day which runs into millions of pounds could not have been subscribed by the comparatively small class of wealthy capitalists. The security promised was illusory, for it was still open to the clever humbug to impose on the credulous and appeal to their cupidity by floating limited-liability companies on bogus enterprises, still open for tens of thousands of small investors, and some large ones, to be persuaded to purchase shares only to discover they had been fleeced.

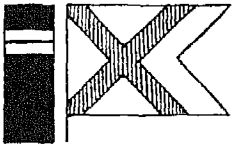
There are social aspects of this Act which are not good. Shareholders want profits, and the only dividend that concerns them is that declared at the company's annual meeting. They have no other interest in the business. The private owner or family group had a pride in ownership and a conscience for the welfare of the industry, be it a ship or a factory, and for their workers. Exceptions are always found, but generally, while legitimately seeking financial returns on their capital, they were actively interested in their concerns, and there were personal relationships between master and man. The limited-liability company is detached and impersonal. Many shareholders, for example, in shipping companies have never seen one of their ships, nor do they know the names of the vessels in their fleet. The inexorable rule of the limited-liability company is that it must pay a cash dividend to its subscribers—that is, it must pursue a policy of narrow self-interest. Man has long supposed competition to be the life-blood of trade, and that it is necessary to be a pirate to succeed. Competition may be a tonic and an incentive, but the life-blood of commerce is co-operation. What barbarity hides behind the words "business is business"!

But has not private enterprise built up our great Merchant Navy in the teeth of the competition from subsidized foreign rivals? Has not private enterprise fostered and developed the steamship until it has earned the tribute that it is the most wonderful creation of man? Has not private enterprise created a trading system, a banking system, an insurance system, and a registration system that command the world's respect? Has not private enterprise made efficiency its watchword and service its goal? Has not private enterprise made Britain the banking centre, the *entrepôt*, the manufacturer, the shopkeeper, the shipbuilder, the carrier for the world? Is there not something splendid in its challenging audacity and in its technical achievements? That individuals do from time to time indulge in shady practices with deplorable consequences is the risk inseparable from freedom to make profits, and are not profits legitimate both as an incentive and reward of effort? All honest bankers, respectable stockbrokers, genuine manufacturers, responsible shipowners and shipbuilders are not to be blamed because of the defalcations of the few. Can they not be trusted to manage their own affairs without let or hindrance, free from all Government controls—and put their own house in order?

History answers in the negative. It is not that capitalism as a system is without merits. Croce, the Italian philosopher, once wrote that liberty and capitalism are



Blue Funnel Line



British India S.N. Company

C.G.T. French Line

United States Lines

inseparable, and he is probably right. In the few Social Democratic countries in the world—New Zealand, Australia, Sweden, and others—the economic system remains over 60 per cent. capitalist, and a Socialist British Government asserts that over 70 per cent. of our industries will remain capitalist. The evils lie not in the system so much as in its abuse. Hence the need for control. Without control liberty descends into licence. Shipowners themselves took the initiative and no better illustration of self-governing, self-disciplining power can be cited than Lloyd's, that historic association of underwriters. It began its function of marine insurance and published its *Register Book of Shipping* in the middle of the eighteenth century. It developed a highly efficient bureau of intelligence, whereby the movements of all ships, at all times, in all ports, and on all the seas of the world, were recorded. All marine-insurance companies subscribed to Lloyd's, who published all this information in *Lloyd's List.* It was a non-profit-making undertaking, offering this comprehensive service, and it was *Lloyd's List*, together with the founding of Lloyd's Register, which made London the world's centre for maritime insurance.

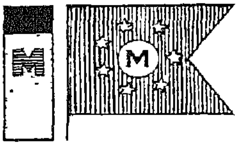
Insurance and Lloyd's

The story of Lloyd's is a romance in itself. This great institution, which in this country originated the profession of insurance without which modern commercial undertakings would be impossible, cannot look back over its 350 years of existence to a single 'pious founder.' It is impossible to say precisely when a given person on a given day covered the first insurance risk. Indeed, some form of mutual aid has existed throughout the civilized ages, and the history of banking and insurance as an organized element in the trade and commerce of this country can be traced to the second half of the sixteenth century, when England began to take her place among the major European Powers. It is not surprising that in its origin, and for a long time afterwards, the only form of insurance was for the protection of ships and shipping. This early form of marine insurance was not a separate business but an additional risk accepted by shipowner, banker, or merchant, and it was confined to the immediate perils of the voyage. Shylock, the moneylender in *The Merchant of Venice*, makes reference to this practice. Sometimes to reduce the risk of losses a few shippers or owners would combine, and their mutual fund arising out of the fact that it is better losses should be shared by the many than press heavily on the few was a recognition of the basic principle underlying all insurance to-day. Those who undertook this additional responsibility of guarantee against loss wrote their names one under the other, just as brokers' slips at Lloyd's to-day are initialled, and became known as underwriters.

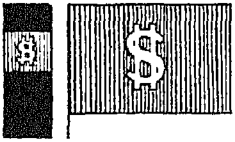
The rendezvous of the commercial world was the Royal Exchange, but in the Great Fire of London (September 1666), so graphically described in the diaries of Pepys and Evelyn, the Royal Exchange was burned out; and so without a home it was natural that the men of business resorted to the coffee-house, the centre around which the life of the day radiated. It was the lineal descendant of the monastic and lay barbers' shops, the university debating halls and taverns of the Middle Ages. Communities forgathered according to their mutual interests. "Will's" in Covent Garden was patronized by Pepys, Dryden, Swift, Addison, and other literary figures. The men of commerce, and presumably the underwriters, met in Tower Street, close to the waterside in the coffee-house kept by Mr Edward Lloyd. He who gives his name to the world-famous insurance was a simple 'coffee-man,' first of Tower Street and later of Lombard Street. But this worthy and respectable citizen, quick to see the advantages of his patronage, began to publish his famous *List*. His 'runners' gathered the news of the town, and from a raised dais a boy, called the Kidney, read them out to the assembled customers. News of the Court, of politics, of foreign affairs, of ships and shipping, of price fluctuations—the news of the day could be obtained at his coffee-house. If you lost anything, if you wished to advertise anything, you went to Mr Edward Lloyd. So when the new Royal Exchange was opened the underwriters remained in his coffee-house. From these simple beginnings grew the greatest insurance exchange in the world.

Two separate and distinct functions, the underwriting, or insurance of shipping, and the collection of marine intelligence about the movement and fate of ships, which were carried on in his coffee-house have both developed—though administered by the same corporation and under the protection and responsibility of the same Act of Parliament—logically and parallel through the centuries. The tiny sheet of news items which he printed and gave or sold to his customers, and which was suppressed by the Government because of an item of Parliamentary news which had given offence, being revived in 1734, after his death, is still published as *Lloyd's List*. Without a break for over two hundred years this unofficial newspaper has the distinction of being the oldest news-sheet in the country.

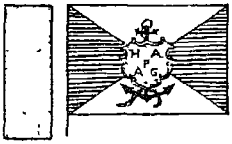
It is clear that safety at sea would be the first consideration of the underwriters. They insisted on high standards of ship-construction and equipment—in short, on everything being done to reduce the risks of disaster at sea to ships and cargoes. To enable assessments of loss or damage to be made the Society of Lloyd's Register, an entirely independent body, though a lineal descendant of Lloyd's, was founded in 1834. All seagoing ships, British and foreign, if so desired by their owners, were classified, and owners accepted the 'class' as a mark of efficiency. A1 at Lloyd's has passed into the coinage of the language as a synonym for efficiency. This pressure from the underwriters served both the interests of shipowners and the community. It could not be withstood, for without a comprehensive insurance policy commerce was strangled. The committee of Lloyd's prosecuted unscrupulous shipowners in cases of fraud in days when the British Government paid little heed to matters of seaworthiness and load-lines.



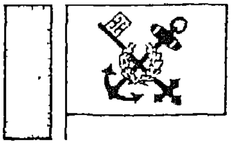
Matson Navigation Company



Dollar Steamship Line



HAPAG
Hamburg-Amerika Line



Norddeutscher Lloyd

The only British rival, as a classification society, to Lloyd's Register was the British Corporation for the Survey and Registry of Shipping, founded at Glasgow in 1890.

Shipowners' Societies

The shipowners themselves assumed responsibilities, organizing mutual insurance schemes, and, above all, providing an authoritative voice that could speak for the whole industry. The Liverpool Steam-ship Owners' Association was established in 1858, and twenty years later the General Shipowners' Society, to which was affiliated a large number of local shipowners' associations, was founded. These were defensive organizations to protect shipping interests, but they provided a responsible authority through which negotiations with the State could be carried on. They fell into the danger which besets all forms of co-operation by employers of failing to consider their employees. They too often neglected human life, the most important and valuable form of wealth. The business of owning ships is fiercely competitive. It helps to explain why the progressive steps marked by the various Shipping Acts for the amelioration of the seaman's lot have not always been generally welcomed by the shipowners.

Samuel Plimsoll

It was not commendable of the shipowners to have reacted the way they did to the relentless exposures by the Bristol coal-merchant, Samuel Plimsoll, member of Parliament for Derby. It was chiefly due to his persistent efforts that the Merchant Shipping Act of 1876 was passed, which prevented unseaworthy ships from leaving port, and introduced the Plimsoll Line to stop the overloading of ships, a scandal which had cost many lives at sea. The shipowners resisted this reform. History is a record of amoral forces working through society, but progress is the work of the individual. Samuel Plimsoll is an honoured name. How many poor seamen battled in vain against the wrath of winds and waves in coffin ships, ill found, overloaded, and over-insured by unscrupulous owners?

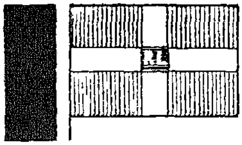
Such fraudulent practices were common at the beginning of the nineteenth century both in this country and abroad, and not unheard of in much later times. Nor were such things confined to shipowners. The factory-owner firing his own mill to reap a big insurance has provided the plot of more than one novel, and it had its counterpart in fact. St John Ervine has dramatically and effectively exposed these malpractices of the shipowner in his play *The Ship*, as did Ibsen in *The Pillars of Society* and Heijermans before him in *The Good Hope.* Not all industrialists were rogues, nor were all shipowners deserving of Plimsoll's indictment, but the boom years in the middle of the century had attracted into shipping circles a minority without traditions or pride of ownership who saw in it only an avenue to big and quick profits. The reluctance of the shipping community to welcome Government restraint of these dubious and greedy owners was not because they in any way approved, but was mainly due to the utilitarian conceptions of no Government interference in business, which had been so sedulously advocated by Jeremy Bentham and John Stuart Mill.

It is not denied that this competitive spirit develops primitive fighting qualities. Napoleonic dreams of conquest have been a powerful incentive in more fields than battle. It is not denied that when there was work in plenty the workers enjoyed cheap food, rents, clothing, travel, amusements, magazines, and education. Were not these justifying the ways of God to man? There were always crumbs for Lazarus from the table of Dives. It is not denied that men were able to rise from humble circumstances to heights of financial dictatorship and stately homes. But it is the character of the impulse—an impulse bred in a social atmosphere saturated with admiration and servility towards wealth—which was so morally ruinous. Those who preached freedom condemned the worker to slavery, and those who preached "Self-help" helped only themselves. In private relationships they may exhibit all the virtues of generosity, kindness, tenderness, and pity, but in the competitive war commercial morality knows only ruthlessness. Galsworthy has pictured it in both novel and play. The fight for social amelioration, for the political rights through which reforms can be compelled, for control over individual licence in the interests of popular liberties and general well-being, has been met by the battalions of honest business-men, financiers, brokers, and respectable employers in solid opposition to any infringement of their self-proclaimed rights.

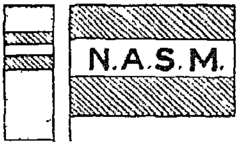
Foreign Labour in British Ships

Was it a benevolent interest in the coloured races that led the shipowners to employ them? Were they more sober, more efficient, and better disciplined as the shipowners professed in their defence? Or was it a question of cheap labour? On the foreign-going tramp-steamers, and those liners employed on the Eastern and Far Eastern routes, a considerable proportion of Lascars and other Asiatics were included in the crews. Goanese cooks and Javanese waiters were on nearly every passenger ship. During the last few years of the nineteenth century the proportion of foreigners to British reached nearly 20 per cent.

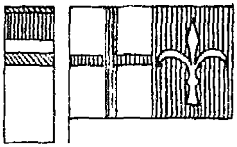
The peak year was 1903, when according to C. Ernest Fayle's scholarly work, *A Short History of the World's Shipping Industry*, "excluding Lascars and other Asiatics employed in ships trading in or to Eastern waters there were very nearly twenty-three foreigners employed in British ships for every hundred British." If we include the Lascars and other Asiatics the figure was nearly half. Nearly half the crews on British ships were foreigners, attracted from countries with a lower standard of living than



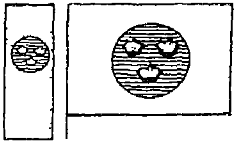
Rotterdamsche Lloyd



Holland-Amerika Line



Italia Line



Swedish-America Line

ours. It needs no imagination to appreciate the problems of controlling such a motley crew or the heightened risks in the event of shipwreck or other calamity. Let it be agreed that by the nature of the employment the seafaring life is more international and cosmopolitan, for many crews are recruited and discharged in foreign ports. So long as there was no security of employment it was advantageous to shipowners to buy their labour in the cheapest market. All protestations that this foreign labour was superior to home labour were sheer humbug. If there was a shortage of British crews the root of the matter was that the wages and conditions of work were better on land than at sea, and men who otherwise would have preferred a seafarer's life—for the instinct is strong in an island people—could not accept or tolerate the working- and pay-conditions offered by British shipowners. It was part and parcel of the prevailing philosophy that all is well if the business pays a cash dividend. Human welfare, the only true source of wealth, was of no account. "Buy cheap and sell dear" was the axiom of business.

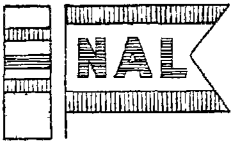
Against this prevailing philosophy, and against the smugness and complacency which went with it, Carlyle thundered his gospel of the dignity of labour, Matthew Arnold jibed at the "philistines," Ruskin advocated a new view of life, in which the amenities and graces should be esteemed above money-making, and William Morris demonstrated his ideas. Blatchford and Hyndman founded a Social Democratic Federation, putting up Parliamentary candidates in 1885. Mr and Mrs Sidney Webb, with Mr George Bernard Shaw, founded the Fabian Society, with evolutionary Fabian tactics opposed to revolutionary methods, and G.B.S., through his witty didactic plays, and H. G. Wells in his social anticipations whipped the hypocrisies of their time. A social conscience was awakened. Disraeli, by an Act in 1875, put the trade unions on a legal footing, and on August 15, 1889, John Burns succeeded in calling out the London dockers on a strike, which forced the shipping companies to concede all their demands. This strike for an hourly rate of sixpence—"the dockers' tanner"—brought out eighty thousand men in a fortnight. Their demand was refused by the employers, but after the intervention of the Lord Mayor of London, Cardinal Manning, and others agreement was reached, and the dockers scored a great victory. Pay for ordinary work was advanced from fourpence to sixpence an hour, with overtime at eightpence, and there were other concessions. John Burns became a national figure. The last quarter of the nineteenth century saw the passing into law of Factory Acts, Poor Laws, Health and Housing Acts. The principle of Government interference was now established. But to any attempts by the Board of Trade to raise the standards of working-conditions for seamen the shipowners offered stubborn opposition.

Havelock Wilson

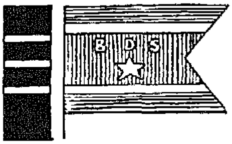
It was in 1887 that Havelock Wilson, a young sailor, began his campaign for the improvement of working conditions at sea, and for the principle that the men should have a voice in the questions affecting them, such as hours, terms of employment, and wage rates. A seaman on a foreign-going steamer averaged 80*s.* to 95*s.* a month in 1890, and his pay ended when he 'signed off' at the end of the trip. Moreover, he could not draw his wages until the completion of the voyage. It was a method which left the seaman at the mercy of his master. This practice still obtains and is a present source of grievance. The owners combined in a Shipping Federation to break him. If there is romance and inspiration in the achievements of the great shipowners there is a nobler courage and a finer inspiration in the story of this young leader, eking out existence by the little earnings of his loyal wife in a small restaurant, often frustrated by the very men whose cause he championed, fighting alone against mighty odds, fighting the powerful, wealthy shipping magnates, not for personal aggrandizement but for social betterment, fighting in one of the most relentless conflicts in the history of industrialization. Neither imprisonment which he suffered, nor the threat of bankruptcy from which he was saved by an anonymous gift, nor the implacability of his opponents, nor—harder still—the sabotage of his efforts by thankless men, broke him from his purpose. With dynamic energy he rushed from port to port organizing the most difficult type of labour, rallying the seamen under his leadership. He founded the National Seamen's Union in 1889, established a Home for Seamen in 1890 at Cardiff, won his election to Parliament, and finally called the great seamen's strike in 1911.

In the annals of the shipping industry the name of Havelock Wilson stands beside that of Samuel Plimsoll, worthy to be honoured. His refusal in 1914 to allow the national emergency to become the seaman's opportunity, his untiring energy in the service of his country, relentless as it had been through his thirty years of industrial fighting, not only won admiration and respect but produced results. Four years of war imposed on the industry the ideal for which he had struggled—co-operation not conflict. In 1919 the National Maritime Board, the Parliament of shipping, where representatives of the owners' federations sit side by side with representatives of the various organizations of deck officers, engineers, and crews, was permanently established. Improved conditions, a standard wage, recognition of the union, and permanent conciliative and consultative machinery to deal with disputes were substantial gains. A beginning had been made.

Wages in shipping, as in other industries, soared during the war, and an A.B.'s wages between 1918 and 1921 was £14 10*s.* a month, though, of course, its purchasing power had been reduced by the higher cost of living. This advantage, however, owing to the prolonged slump which followed the war, was lost to seamen. Shipowners with rows of laid-up ships reported their earning powers had been greatly reduced. The men's representatives were firm—"all but the little huddled old cripple in the front row who sat silent, staring fixedly and blinking slowly like a wise owl." Havelock Wilson was

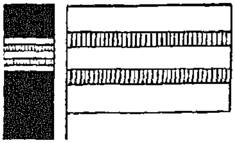


Norske-Amerika Line



Bergen Steamship Company

Messageries Maritimes



Nippon Yusen Kaisha

confronted at that meeting with the crisis of his life. He urged an adjournment, and, supporting himself with two sticks and accompanied by devoted lieutenants, he led his party from the chamber. Thirty minutes later the meeting reassembled, and Havelock Wilson, in his simple direct manner, said, "We agree to a £2 10*s.* cut in monthly rates of pay." Sir Archibald Hurd adds as a comment to this account which he gives of that occasion, "The seamen's wage to-day [April 14, 1943] is 92 per cent. above that of 1914, and the industry has not known a strike for sixteen years."

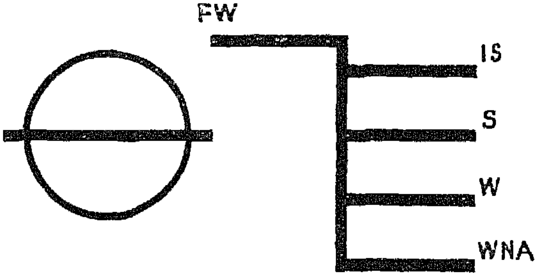
Seamen's Wages

Are the wages so very rewarding? The pay ranges from £8 10*s.* a month for an ordinary seaman of less than two years' service—learning his job—to £14 for an able-bodied seaman, plus war-risk money. But in normal times the average number of months during the year that a seaman is employed rarely exceeds ten, for when a voyage ends he 'signs off.' His pay then ceases until he 'signs on' again. It is true that many companies kept some of their men on pay between voyages acting as riggers, etc., in the dock organization, but this was a privilege and not a right. In the Merchant Service there are few bright hopes of promotion. Gravesend Sea School has a nine-months' waiting-list. A seaman in the big ships may ultimately become a boatswain, but for the great majority there are no prospects. In terms of dollars the basic pay, plus war bonus, of an able seaman per month is only 96 compared with 202 received by U.S. seamen—a big disparity, making allowances for costs of living. It should be added, however, that British seamen are better protected against the emergencies of life. The Merchant Navy Pool is designed to cover the pay-gap while waiting for a ship, and at last, too, he is entitled to unemployment benefits through being admitted to the National Insurance scheme. A pension scheme has now been introduced for the sailor, for which he qualifies at sixty-five—that is, when he has completed fifty years' service in this most hazardous of occupations—a benefit that compares poorly with the pensions scheme of the Royal Navy. The Dutch provide for the employment of seamen after the war by paying 80 per cent. of full wages for the first eight weeks, and 75 per cent. for twenty-seven weeks more, depending on length of service; while their pay when in work is higher than that of our seamen.

But what of the years between? The seaman again is receiving war-wages, and again every ship that will float is at sea. In 1938 one seaman in every four was out of work, and sixty thousand seamen came ashore. Despite all the tributes to their bravery and sacrifice they were discharged by the shipping companies. Where were the fortunes amassed through the courage and endurance of these men during the war years? They had vanished "into air, into thin air." The ships bought at inflated prices—Fairplay's index-figures of the capital appreciation of ships between 1914 and 1918 read like Baron Munchausen's fairy tales—were expected to pay profits at a time when the world's tonnage was far in excess of the world's requirements. By 1923 the seamen's wage-rate had sunk to about £9 per month. Were the old, outdated ships scrapped and a bold new programme of modern ships begun? Was a far-sighted, daring attempt made to improve and maintain the merchant marine? The corrosive effects of the slump were allowed to eat out the life of the industry. Ships were sold abroad at ridiculously low prices and were often run by foreign owners in competition with our remaining shipping. If they could be of no prospective use they ought to have been scrapped at home. Some were sold for scrap abroad and came back at us in the form of shrapnel. In a desperate attempt to save the interests of the shareholders every economy was practised, and the first was to discharge the men.

The shipbuilder and shipowner have their answer. The masters in the cotton and woollen factories, in the iron- and steel-works, in the potteries and the coalfields—all have their answer. With the estuaries full of laid-up shipping, year after year, the shipowners could not continue to keep their crews on pay. Without orders to build, the shipbuilders could not keep their men employed. For them, as for other industrialists caught in the slump, there was no alternative. It was the magnitude of this tragedy which struck with full force both Britain and America that forced social analysis, which hitherto had concerned itself with the abuses of the prevailing system of social and economic values, to probe deeper and challenge the system itself. Literature and drama and film reflected this new approach, particularly John Steinbeck's powerful indictment, *The Grapes of Wrath*, and Walter Greenwood's *Love on the Dole*. This was a new trend of thought. So far it had hinged round the distinction of the good capitalist and the bad, the reasonable and the unreasonable—a conception which, whatever its merits, is certainly fatal to revolutionism of thought. Karl Radek has justly observed the stultifying timidity which fell on European philosophy after the June days of 1848, and which has held back orthodox thought from any major development since Hegel. But the catastrophe of mass-unemployment with all its attendant miseries could not be ignored. Some apologists burked all the major problems by confusing the working classes with the down-and-outs. The reason was painfully apparent. This disintegration of society under the attacks of individualism and egotism, this cult of the ego unbridled by social restrictions which created the dehumanizing anti-social industrialism of the last hundred and fifty years, has brought us to the political suicide of Hitler, and the æsthetic suicide of Joyce and the Surrealists.

Within the framework of the prevailing economic and social conceptions the Government did what it could. Considerations both humanitarian and political demanded some action. Industries were concentrated and firms closed down in an economy drive. Trading estates and other measures made some improvement, but were insufficient to deal with the real problem. Piecemeal financial assistance brought some relief. Attempts were made to secure a better industrial balance—but these were all palliatives. The national emergency was to save the shaking structure of an out-of-date economic system, not to create a more equal society in which human and social life could be fully integrated, not to build a new order on moral foundations of human living, guaranteeing security of existence to every individual. Was there a policy to overcome cyclical depression? Was there large-scale constructive action in a planned effort making the prevention of want and the provision of security an absolute priority? The miseries of mass unemployment make a mockery of the democratic way of life. Not the anodynes of pity, but the emetic of a fresh approach was needed to achieve a permanent recovery from the ills that afflicted society.



F.W. FRESH WATER I.S. INDIAN SUMMER
S. SUMMER W. WINTER
W.N.A. WINTER N. ATLANTIC

THE PLIMSOLL MARK

The Government had no policy. After all, it was the inexorable law of supply and demand, and its consequences had to be accepted. A ruthless system of closing down shipbuilding yards was adopted—thirty-five yards were closed between 1918 and 1939—and 200,000 workers were lost to the industry. Behind these figures lies a great human tragedy. Is this defensible that men should be thrown out of employment and left to whatever mercies there be? It is to be hoped that certificated masters and mates will never again be allowed to languish in poverty or be compelled to hawk vacuum-cleaners, water-softeners, duplicators, and the like, as happened after 1918. Ships were known to sail with a full deck-crew of certificated masters. Britain lives by its seamen and its ships, yet we supinely allowed the very means by which we live to be wrecked.

This is no political argument, though what are politics but a larger ethic? It is a record of the changing outlook, changing conceptions, and changing values which the "revolution of the times" has imposed upon us. The impact of two world-wars has altered the geography of thought. Never again will it be left to shipowners, shipbuilders, and other industrialists to discharge men to face penury and want. This is not liberty but anarchy; not civilization but barbarism. We live in an age of Government controls, of bulk marketing, of priorities in accordance with public needs, of challenge to the philosophy of John Stuart Mill. Sir William Beveridge's *Full Employment in a Free Society* may make political history. It is the twentieth century's restatement of *The Wealth of Nations*. New ideas of social security in a more egalitarian society are shaping new legislation. War hath her victories no less renowned at home than on a foreign field.

CHAPTER XI

COMPETITION AND OWNERSHIP

(1900 TO THE PRESENT DAY)

The Twentieth-century Challenge—Foreign Competitors in Tramp and Liner Trades—Methods of Control—The 'Conference' and Merger—The International Mercantile Marine—The Rise of the German Mercantile Marine.

> If, drunk with sight of power, we loose
>   Wild tongues that have not Thee in awe,
> Such boasting as the Gentiles use,
>   Or lesser breeds without the Law—
> Lord God of Hosts, be with us yet,
> Lest we forget—lest we forget!
>
> RUDYARD KIPLING, *Recessional*

KIPLING, with a poet's prophetic insight, saw that Britain's power and wealth would not always be safe from competition. The 'jingoism,' over-confidence, the pride and boasting, that turned the celebrations of Queen Victoria's Diamond Jubilee in 1897 into an orgy of national self-praise and smug satisfaction revealed the decay of spiritual values during the period of unparalleled prosperity we had enjoyed. Over one-quarter of the earth's surface and one-quarter of the world's population was embraced by our Empire. We were the only great manufacturing country, and our export surpluses were urgently required by the rest of the world. We accepted imports freely and in unlimited quantities from every quarter of the globe. We were the world's biggest creditor nation. We were not only the shopkeepers of the world but the wagoners of the world. Our fleets, ship-yards, and engine-shops were thriving—shipowners and shipbuilders amassed fortunes. Private enterprise was unchecked by social obligations. Trade unions had not yet found their industrial strength. Income-tax and local rates were exceptionally low. There was plenty of money fructifying in the pockets of the more fortunate classes. Who were the more fortunate classes? Not the work-people, not the shipwrights, not the men in the fo'c'sle, not the men who built and manned the ships. Dividend-bearing securities, home and foreign, were not for them. The social sores were ignored.

The twentieth century brought its clarion of challenge. Blériot flew across the Channel in 1909, the sign of a rapidly narrowing world. Between 1892 and 1894 four out of five of all the ships on the seas were launched in this country. In 1890 over 80 per cent. of the steamships with cargoes which entered or cleared British ports were under the Red Ensign. These were halcyon days for shipowners, shipbuilders, and the rest of the industrial plutocracy owning mines and factories. "We have what we hold," was their attitude. Could they not see that all this disparity of wealth, both at home and ostentatiously displayed to the less fortunate nations of the world, must lead to a conflict between the 'haves' and the 'have-nots'? Hoist by their own petard, the poor combined to get their share. In 1900 the Trade Union Congress founded a new political party with a Socialist programme, and in forty-five years it has grown strong enough to form a majority Labour Government. The Continental countries, as conditions following the Franco-Prussian War of 1870 became more settled, now looked with envious eyes at Britain. The years between 1848 and 1871 had seen a long succession of wars and revolutions from which we had escaped. The Continental Powers began to build up their national strength. They began to compete. By the beginning of the twentieth century their competition began to be keenly felt.

Foreign Competition

Particularly was this the case in shipping. That there should be international competition for the traffic of the seas was no new thing. Cromwell's Navigation Act was passed to combat competition. Indeed, throughout the seventeenth and eighteenth centuries international rivalry was waged with armed ships, and legislative penal measures against any invaders daring to steal into national preserves for each country sought monopolies over the routes between the Motherland and her dependencies. This competition was of a different kind. It was peaceful, and it was massive. For the most part it was a competition in efficiency. France was an early challenger, pioneering new services. In 1870 and thereafter she had an important modern and fast fleet on the Atlantic and Gulf routes. This continental competition was not always fair though free.

German, French, Italian, Dutch, Scandinavian, Greek, American, and Japanese shipowners—in many instances receiving financial assistance, direct or indirect, from their respective Governments—entered at different stages into the competitive struggle both in the liner and tramp trades, and their competitive effect was cumulative. The nucleus of their mercantile fleets in many cases was composed of British-built ships. To nurse their youthful and growing merchant fleets some nations granted subsidies and passed Navigation Acts designed to exclude foreign competitors. At the end of the Boer War in 1902, a war of which little good can be said except of the peace treaty, we were left with more ships created by that brief transport boom than we could profitably employ. The ship-yards were building tonnage for foreign owners. Just as our industrialists had now to face severe competition from the Continent, especially Germany glowing with a new sense of victorious nationalism, so our shipowners were faced with a fight for a trade which for so long had been in their own hands. This unquestionably stimulated the best brains to serve the shipping industry by improvements in the design of ships and engines, harbour accommodation, and administration.

Though they were not the first to feel the effects of the foreign competition, it proved most crippling to the steamers engaged in the tramp trades. The tramp business is at best precarious, and always vulnerable. A tramp steamer is cheap to buy and to run. She is invariably fitted with steam reciprocators—the cheapest, most reliable, most serviceable, general-utility engine—and will plug along on her 'Scotch' boilers at no more than eight or ten knots. She has no fixed route nor fixed time-table, and will charter a cargo from anywhere to anywhere. She is a single competitive unit, and the economy of her upkeep and running permit her to undercut, quoting rates as low as possible to secure cargo. As she is not bound by a schedule she can go after business wherever it is to be found in the ports of the world, or if it serves her advantage better, wait for a rise in prices. She can trade in unfrequented waters where regular liners do not serve. When trade is good profits are handsome, a temptation which attracts into the trade during boom periods newcomers, who in their turn become severe competitors in the lean years. Since it is so comparatively easy to establish a firm in the tramp trades it is a field for the speculator, and in the past the mushroom companies, who tried to rake off the profits of a boom, neglected to provide reserves against a slump, and to consider that a ship is a wasting asset.. These adventurers had no standards to maintain, and some of them in a less polite age would have been the companions of Quelch and Captain Kidd.

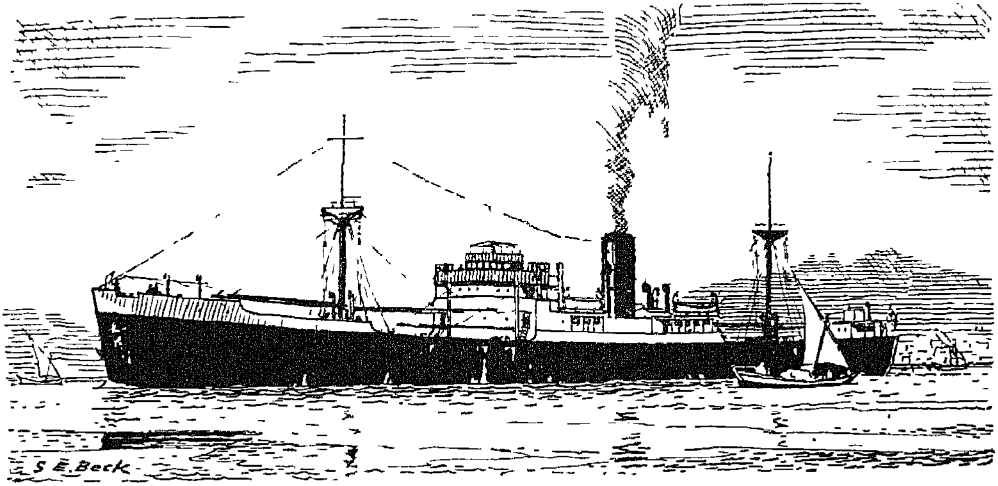
The Baltic Exchange

The chartering of tramp tonnage is done on the Baltic Exchange, which continues the functions originally fulfilled by the Baltic Coffee-house. Here all shipping is 'fixed.' The brokers, representing the owner of cargo to be transported, drives a hard bargain with the shipping companies' broker as to cost of freight, and in these transactions the contract is usually secured by the one quoting the cheapest figure. This contract is legally established in an agreement called a "charter-party," which provides a statement of cargo amounts—for example, the maximum the charterer proposes to send and the minimum the chartered ship promises to carry—thus affording a margin enabling the vessel to take on sufficient fuel, as well as statements concerning brokerage charges, and who is responsible for the costs of loading and unloading.

Tramp Competition

The Scandinavians, especially the Norwegians, showed a special aptitude for the tramp business. Their ships carried sail longer than the ships of most other countries, and many of our best British clippers were transferred to them. They maintained a high efficiency, and when they adopted steam kept up the same fine traditions of seamanship. The Scandinavians are born sailors, and have always maintained a merchant fleet in excess of their own requirements. They made severe inroads on our tramp services. The Italians employed a good number of tramps in their own import trades. The Greeks, using mainly second-hand vessels, and paying low wages—some of the conditions under which Greek sailors worked were deplorable—were formidable competitors. After 1918 they bought many of our unwanted ships at break-up prices and then competed with them. Some unscrupulous companies registered themselves in London with a nominal number of British directors and shareholders, and, flying the British flag, though operated and controlled by foreign owners, brought the Red Ensign into disrepute. They do an enormous tramping trade over the entire world. Many of the Greek owners had up to the Second World War important tonnage. Most countries employed their own tramps and many subsidized them.

So parlous had the situation become, owing to unfair foreign competition in the tramp shipping industry, that in 1935 the British Shipping (Assistance) Act was passed, granting a subsidy of £2,000,000 to tramp shipping, providing that there was a thorough reorganization. Particular emphasis was laid on the need for reducing domestic competition, improving freight rates and conditions, and encouraging, in the face of subsidized foreign competition, the fullest possible employment of British tramp shipping. Cut-throat competition was eliminated by the fixing of minimum freight charges, and any offender who quoted less forfeited his rights to a subsidy. To-day, there are many substantial tramp firms, and the change of the times has driven the unscrupulous speculative adventurer out of the business. To-day 90 per cent. of the tramping is done by big responsible companies and the rest by merchanting firms. Rules and regulations imposed by the Board of Trade and the men's Unions have secured much-needed reforms and removed the stigma of the old-time tramping conditions.

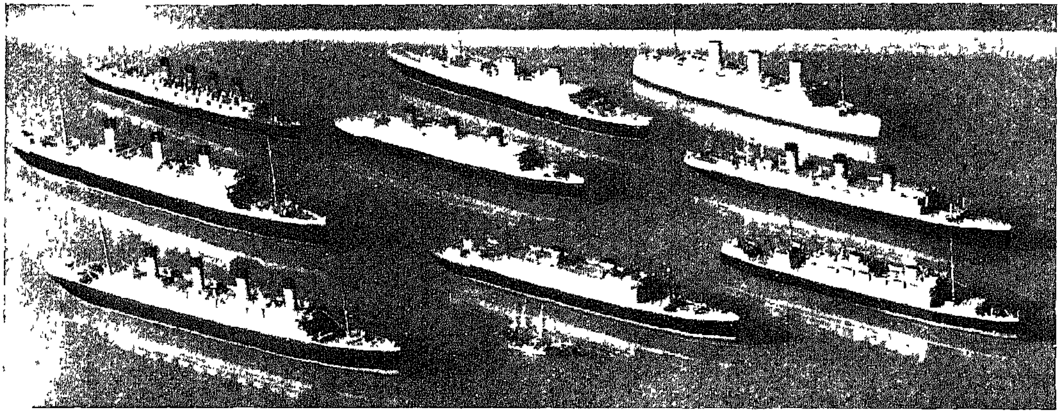


A TRAMP STEAMER

These steamers must be economical and able to load with their own derricks, since out-of-the-way ports may have no shore plant

Liner Competition

But if competition in the tramp trades was ruinous it was also desperately keen in the liner services. Here the situation was different. Not the single ship but the fleet was the competitive unit, and, unlike the tramp services, which were often slenderly financed, the liner companies had strong capital reserves. They were well organized, and their services were highly efficient. Liners run to schedule, and keep faith with their passengers, announcing times of departure and arrival and making every effort to keep them. Cargo liners may modify their schedules in order to fill up, even when there are some pasengers; but the liner, properly called, sails whether she is full or almost empty. Liners run over fixed routes and must keep their appointed times. They have speed and standards of equipment as well as construction that make them costly to maintain. A liner that caters for passenger-traffic has to provide not merely comfort, yet the inducement of luxury-travel involves heavy overhead expenses in working.



A Group of Water-line Models of Typical Modern Liners

Reading from left to right, they are (top row) the old *Mauretania*, the Italian liner *Rex*, C.P.R. *Empress of Britain*, (second row) White Star *Majestic*, Compagnie Sud-Atlantique, Paris, *L'Atlantique*, Cunard-White Star *Berengaria*, the ex-German *Imperator*, (bottom row) Cunard-White Star *Olympic*, U.S Lines *Manhattan*, Royal Mail Lines R M S *Asturias*.

By courtesy of Bassett-Lowke, Ltd

But because the liner services have stronger financial backing, and because they cover definite routes where commercial connexions can be established, they are able to keep going when the tramps have been forced into idleness. It was the liner services that first met the blast of international competition.

How intense this competition had become is shown by the percentage-table of the world's gross steam tonnage in July 1914, given in *Brassey's Naval and Shipping Annual*, 1924, and cited by C. Ernest Fayle in his *Short History of the World's Shipping Industry*:

A. British Empire, 47·7 (United Kingdom, 44·4)
B. Germany, 12·0
C. Norway, 4·5; France, 4·5; U.S.A., 4·3; Japan, 3·9; Holland, 3·5; Italy, 3·4
D. Austria-Hungary, 2·5; Sweden, 2·3; Spain, 2·1; Greece, 1·9; Denmark, 1·8
E. All other Powers, 5·6

Shipping 'Rings' and Mergers

As early as 1879, to control the wild scramble and suicidal competition among the liner services operating between Britain and the East, the China Conference came into being. This fixed a common standard of freight charges applying to the China trade, and the success of this method led next to the application of the conference method to the Australian routes, and afterwards to all the world's principal services. For the liner services were especially sensitive to rate-cutting, and to avoid domestic under-cutting, and as a defensive measure against foreign attack, the conference stabilized freights and ensured regularity of service. All the partners were held to their agreements by a disciplinary method of paying deferred rebates, so that, in effect, a 'ring' was established. It is a method which has its parallel in the trade associations which have sprung up mostly within the last thirty years in England and America, and which have become the most powerful organizations in the economic world, and its forerunner was the medieval Merchant Guild, which wielded almost absolute authority over its members by a heavy-handed system of penalties. The danger of all forms of co-operation by employers is that they will use the power that co-operation gives them to raise charges to an artificially high level and pursue a policy of narrow self-interest. These shipping 'rings' have been severely criticized for their monopolistic tendencies, but, on the whole, they justified themselves. The Royal Commission on Shipping Rings in 1909, while observing that their operations must be carefully watched, absolved the shipping companies of any considerable abuse of the system. The 1919 report of the Committee on Trusts recommends public supervision and, in special cases, "the transfer to public ownership of an individual firm or the whole of an industry" if their activities are not in the public interest.

A second measure of defence was a change in the technique of shipowning. The merger, complete or partial, and the combine, aimed at grouping shipping companies under a single executive direction. This was done by acquiring controlling blocks of share capital. Many famous lines have gone, being bought out entirely. By centralizing control, and effecting economies in administration and operation, rationalization of services became possible. Companies still carried their own house-flags and preserved their identities as far as internal matters went, but were subject to an overriding authority. The disadvantage was that in many instances neither officers nor men really knew who owned their ships, so remote had the ownership become, a psychological factor of no mean consequence. This tendency towards the creation of vast amalgamations and the combination of capital resources was accentuated by the First World War. The loss of ships during the war meant that regular services which had been established could not be maintained without some pooling process. To-day nearly a quarter of British tonnage is so controlled. Such great combines as the Cunard-White Star, Royal Mail, P. and O., Union Castle (whose latest motor-liners to the Cape are lovely in line and colours and are among the most beautiful ships on the ocean), Ellerman and Furness Withy, and others have interlocked the shipping interests so that they are powerful and efficient competitors.

The greatest of all merger-combines was the International Mercantile Marine, of New York, which was formed under its present title in 1902. In the United States it was known as the Shipping Trust, and in Britain as the Morgan Combine. The nucleus of its ships was American and dates back to the seventies, when after the withdrawal of the ill-starred Collins Line in 1858 there had been no important transatlantic American-owned service, and it was strongly felt that American vessels under the United States flag should be sharing in the prosperity of Atlantic travel. The American Line, the Red Star Line, The National Line, all opened services. Then came the famous Atlantic Transport Line, which, though run on American capital and under American management, was registered as a British Company. Harland and Wolff, the great Belfast shipbuilders, built for them in 1900 the 13,000-ton "Minne" steamers, the *Minnehaha*, *Minnetonka*, *Minneapolis*, for the New York-London service. The great Inman Line, which had been so successfully run by the Liverpool shipowner, William Inman, since 1850, passed over at his death, in 1886, as a unit under the control of the American combine. The transfer of the crack Inman liners, *City of New York* and *City of Paris*, both 10,670 tons doing 20 knots to American registry, when they were renamed *New York* and *Philadelphia*, operated by the Inman and International Company, was the first major development of this invasion of the Atlantic by the American trust. In 1902, in pursuit of their policy of acquiring British interests, a new company, with Pierpont Morgan as its financial genius and Lord Pirrie, of the Belfast shipbuilders, at its head, was formed with a capital of a hundred and twenty million dollars under the title of the International Mercantile Marine.

This gigantic trust either bought out entirely, or secured the controlling share interest in, nearly every British passenger line worthy of the name. They were prepared to pay ransom prices in cash, and a list of the companies under their 'umbrella' makes formidable reading—White Star, Dominion, Shaw, Savill, and Albion, with its fleet in the New Zealand-Australian trade, Atlantic Transport, American, Leyland, and later the Holland-Amerika are some of the famous firms. The Cunard Line stood out against every effort of the Trust to purchase it, but they had to appeal to the Government for help to meet this massive competition. The British Government could not be indifferent, for this American control threatened to leave us without a reserve of auxiliary cruisers. The British Government agreed to subsidize the building of two fast turbine-liners, the *Lusitania* and the *Mauretania*, which were to recover the Blue Riband from the Germans and to raise the fallen prestige of British ships on the Atlantic. The *Lusitania*, of tragic memory, first broke the record, but it was the *Mauretania* that earned the title "Queen of the Atlantic," being the faster of the two. They were both lovely ships, fast, and the biggest afloat. They set a new standard of achievement in Atlantic crossings.

The postscript to the operations of the I.M.M. Company was written in 1915, when the combine became insolvent and Mr P. A. S. Franklyn was appointed receiver. Through his energies and ability in a little more than a year the company became solvent again. Ten years later they began to dispose of their European interests, and now they confine themselves to the ownership or management of American lines chiefly operating in coastal waters and on the Pacific. They have close interests too with the American mercantile marine.

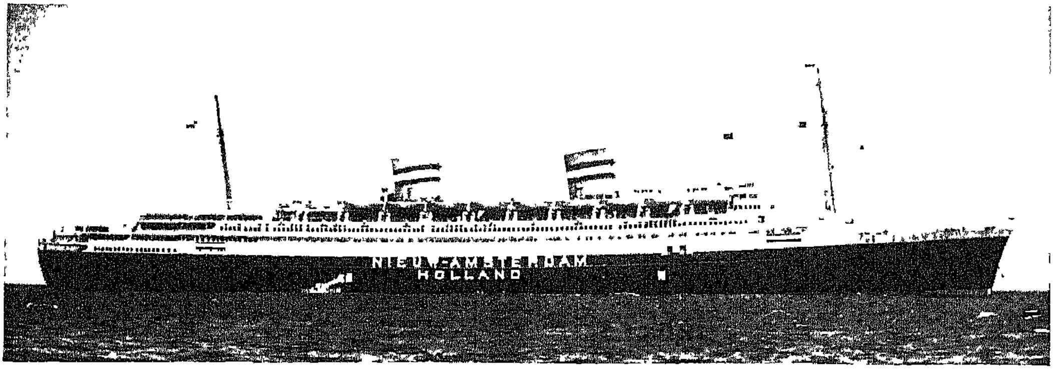
The trust is the opposite extreme of free competition, and while it served as a rationalizing and pooling method, ensuring the most efficient use of tonnage, its chief interest is in paying a return to its shareholders. The I.M.M. Company, in its ambitious effort to bring most of the world shipping under a single control, failed, firstly because it was over-capitalized, and it could not make its heavy outlays on shipping yield a return, and secondly because its ramifications were so extensive that it was undesirable that so much power should reside in a private corporation. But the combine, merger, trust, or whatever form of financial and managerial control is created, has its merits.

It is the realization by the shipping world that unrestricted competition is unnatural and fallacious, and that constructive intelligent competition depends on studied co-operation. While all this self-government is a move away from unrestricted competition and towards a more or less voluntary co-operation, the flaw remains that the instrument is designed primarily for self-interest. Labour, and the trade unions which represent it, were not welcomed as co-operators. But they have been unable to withstand the forces of change that are in progress—the upsurge of revolutionary ideas that cannot be dammed nor deflected, which insist that all industry shall serve all men's interest, and that to ensure it there must be more and more Government regulation. The 'planning' State has come; and in greater or lesser degree it has come to stay. It is the logical extension of the planning which industry itself in its own self-interest had adopted.

Dutch, Italian, and French Competition

The Dutch developed the route from Holland to the Dutch East Indies, and by 1910 the Nederland Line had in service twenty-four steamers, many of them beautiful and comfortable ships, totalling 114,000 tons. The Rotterdamsche Lloyd, established in Rotterdam in June 1883, and which grew out of much earlier concerns operating with sailing-vessels plying to the far East, possesses a large, fast fleet of modern, well-equipped vessels, and in 1909 made no less than fifty-two voyages, her steamers travelling a total of a million miles. The tonnage of this fleet of thirty steamships and motor-ships at the outbreak of the present war totalled approximately 240,000 tons. The Holland-Amerika Line bought their first steamships from British owners and commenced a service from Rotterdam to New York in 1872. Thirty years later, in 1902, this line came under the control of that giant merger the International Mercantile Marine Company. In 1914 the fleet comprised twelve steamers with a total of approximately 125,000 tons. When in 1926 the merger began to give up its European enterprises the Dutch people bought back the Holland-Amerika Line, so that it became an entirely Dutch concern. With State assistance the line added magnificent ships to her fleet, the pride of them all being the *Nieuw Amsterdam*, of 36,287 tons, launched in 1938, the largest and the loveliest ship ever built in Holland. With her running mates, the *Statendam* and the *Rotterdam*, which carry forward the tradition of fine ships for which this line during its seventy years of history has become famous, these Dutch transatlantic liners have an enviable reputation for service and comfort.

The Italians developed liner routes to America and the Far East. They bought their ships on the Clyde, and in 1914 a fleet of nearly forty steamers was operating from Trieste. The First World War gave a great impetus to Italian shipping and shipbuilding. This was tremendously encouraged by the Fascist Government, under Mussolini, whose imperialistic ambitions took into account the use to which a fleet of faster merchantmen could be put in war. Her shipping companies were reorganized and combined, her fleets substantially increased in the interests of aggressive nationalism, and in 1925 the last big Italian ship to be constructed out of Italy, the *Conte Biancamano*, of 24,416 tons, built on the Clyde by Beardmores, marks the rise of Italy's shipbuilding industry. By subsidies, bounties, and reliefs from dues, Italian shipowning and shipbuilding was fostered. In 1927 the world's largest motor-ship, *Augustus*, of 30,400 tons, was launched from the Ansaldo yards, at Sestri Ponente, while in 1932 the Italian United Fleets, a combine of shipping companies, had delivered to them the two great, express, record-making liners, *Rex*, 51,062 tons, built at Genoa—a casualty of the Second World War—and *Conte di Savoia*, 48,502 tons, built at Trieste.



T.S. "Nieuw Amsterdam" (36,287 Tons)

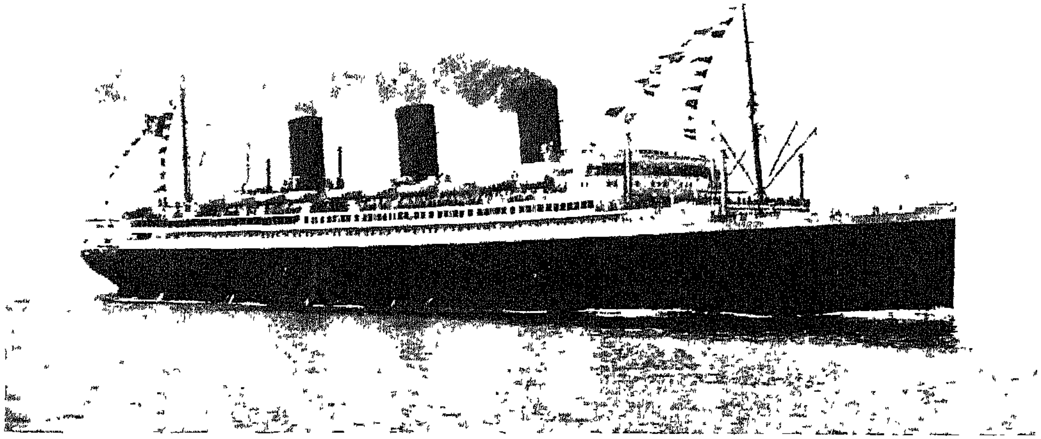
This ship was built by the Rotterdam Dry Dock Company in 1938. She is the finest vessel of the Holland-Amerika Line and the largest ever built in Holland

By courtesy of Holland-Amerika Line

The French joined in the competition for the liner trades. The Compagnie Générale Transatlantique, of Paris, commonly known as the French Line, had commenced a service from Havre to New York in 1862 with British-built steamships. They built ships in France, some of them in their own shipbuilding yard, though the first *Normandie*, a fine vessel of over 6000 tons and with a speed of 17 knots, was built in 1882 at Barrow-in-Furness. The first French-built turbine-liner, the *France*, of 23,666 tons and a speed of 23½ knots, was launched in 1910, and entered the Atlantic service in 1912. After the *Paris*, a splendid liner of 34,569 tons completed in 1921, came the beautiful *Île de France*, of 1926, with a tonnage of 43,158; the pride of France until in 1935 the mighty, though ill-fated, 83,400-ton *Normandie* made her maiden voyage to New York. The *Normandie*, salvaged and refitted, is now owned by the United States and has been rechristened the *Lafayette*.

The Compagnie des Messageries Maritimes covered the Mediterranean, Near East, and Far Eastern routes, carrying Indian and China mails for France. They developed the Australian service, and had an important liner-connexion with South America. By 1901, in fifty years, the fleet had grown to sixty vessels of 241,185 tons gross, and these ships had travelled a distance of 1,014,464 sea miles during that year. The French mercantile fleet was no mean competitor.

The Japanese made the most astonishing strides. The Nippon Yusen Kaisha, now the Kaisya, or Japanese Mail Company, was established in Tokio in 1885. All their first steamers were British-built, and officered in both deck and engineering departments by British officers. The Brazilian Lloyd too was manned largely by British officers on British-built ships. By 1914 shipbuilding yards were in existence in Japan, and during the First World War these were rapidly extended, at the urgent request of the British Government, to help in the renewal of shipping losses. The Japanese Government heavily subsidized its shipping, and the trans-Pacific services of the Toyo Kisen K.K. was receiving a subsidy in 1896. After 1918 Japanese liners were severely competing, not only on the Pacific routes to California and British Columbia, but on the services to New York by way of the Panama Canal, and they were competing on the Eastern route also, and almost captured the trade in the China seas. Within forty years the Japanese rose to the third place among the merchant-shipping Powers. It was estimated in 1938 that Japan possessed six and a half million tons of ocean-going shipping.



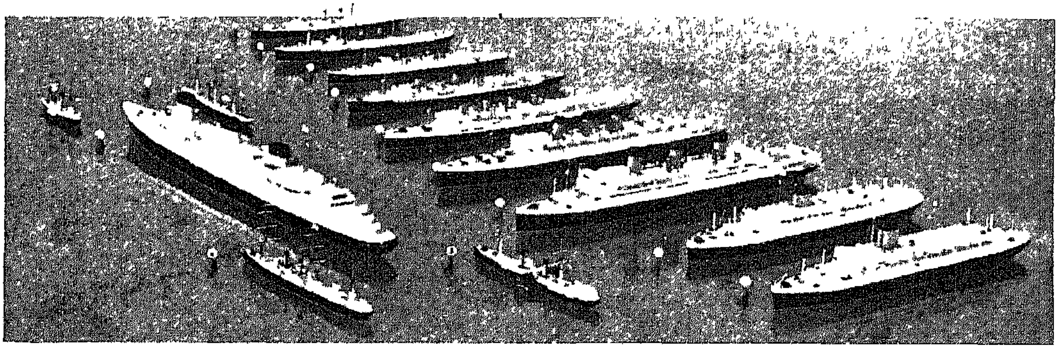
French Line T.S. "Île de France" (43,158 Tons)

This vessel was built in 1927 at Saint Nazaire

By courtesy of C.G.T. (French Line)

The German Competition

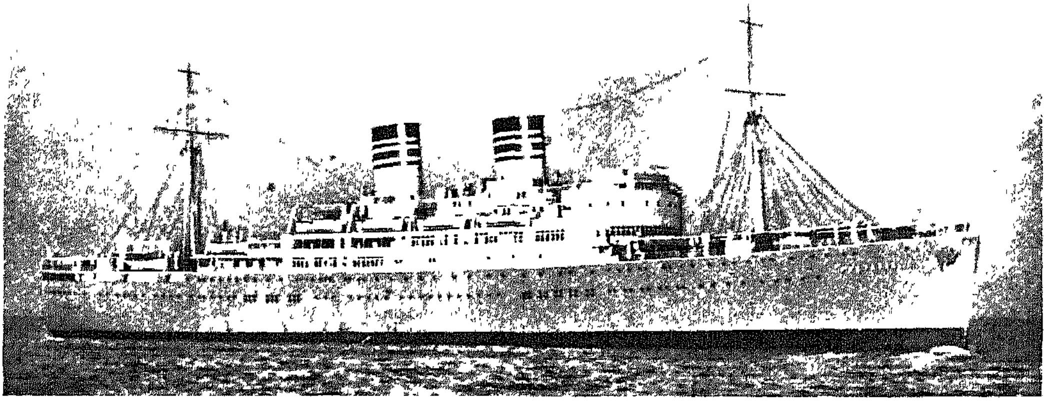
But the fiercest competition came from Germany. The whole of the German shipping industry was organized and strongly supported by every form of financial aid, direct and indirect, and the attack of their shipping was sharply felt in every sea. By great amalgamations of capital and pooled shipping, and by that flair for organization which is so characteristic a feature of their character, they used their shipping as a ruthless weapon of aggressive nationalism. The two great rival shipping combines, the Hamburg-Amerika Line and the Norddeutscher Lloyd, though almost impossible to reconcile even under the pressure of Hitler, who sought to compel them to work in association, were the spearheads of attack. They worked in close association with the State Railways and State Banks, and established world-wide and highly efficient agencies to arrange the booking of passengers and freights. Characteristic thoroughness and efficiency, combined with an unscrupulous policy in rate-cutting, in an obligation on German emigrants to sail in German ships, and on German merchandise to pass through German hands, a genius for engineering and shipbuilding, a system of Government subsidies and bounties—all these combined to make the German competition menacing.



The History of the French Line in Model Form

These models are all to the same scale (a five-hundredth), commencing with *Paris* (1856) and ending with the *Normandie* (1935). They were made by Bassett-Lowke, Ltd., to the order of the French Line

The Hamburg-Amerika Line, universally known as HAPAG was originally founded in 1847 by a group of Hamburg merchants and began with sailing-ships. Their first steamer, the *Borussia*, was built for them in 1855 by Cairds of Greenock. It was soon followed by a sister-ship, the *Hammonia*, and together with the sailing-ships a regular monthly service was maintained until 1860. Later the company absorbed the competing Eagle and Carr Lines, and under the inspiring leadership of its director, Herr Albert Ballin, the line grew so that in 1914 it was the largest single shipping company in the world. Like the White Star Line, HAPAG's general policy was to go in for size and moderate speed, and their 'P' class of big emigrant- and cargo-carriers, of 13,000 tons gross and accommodating over 2400 emigrants each, were famous. The *Deutschland*, of 16,500 tons, built at Stettin in 1900, was their one attempt to break records with express transatlantic liners: but though she captured the Blue Riband, she proved a costly failure. Hopelessly inconsistent, she could never touch her own record speed of 23·51 knots averaged on her Eastern run, and, eating coal and vibrating terribly, she was soon surpassed by the Norddeutscher Lloyd ships. Then she had half her boilers taken out and was reduced to an 18-knot cruising yacht

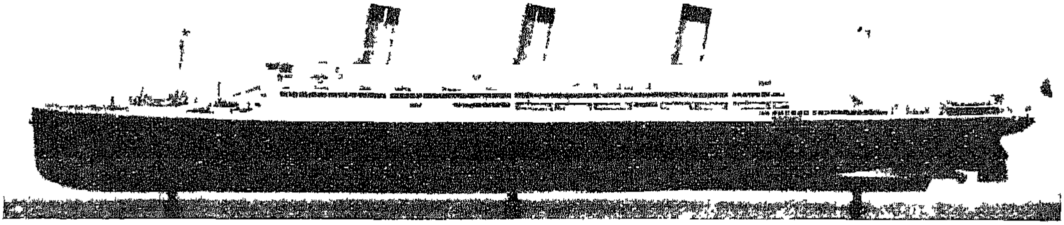


T S 'PRETORIA" (16,700 TONS)
This vessel and T S *Windhuk* were engaged in the German South African Service They were built by Blohm and Voss, Hamburg

Next came the series of big liners, *Amerika*, of 22,622 tons, *Kaiserin Augusta Victoria*, of 24,381 tons, the *President Lincoln* and *President Grant*, each over 18,000 tons, *Cleveland* and *Cincinnati*, of over 16,000 tons each. Besides these liners engaged on the Atlantic service smaller vessels were built for the secondary services all over the world. Ballin planned the building of three mammoth ships, *Imperator*, *Vaterland*, and *Bismarck*, but he died before the *Bismarck* was completed and so was spared the mortification of watching the dispersal of his vast fleet—which in 1914, totalled over a million tons—at the end of the war. Ballin was a pioneer of the popular holiday-cruising liner, and, while he was not the first to run sunshine cruises in the winter, he was the first to put a big transatlantic liner in 1891, the *Augusta Victoria*, on a holiday service in the Mediterranean, calling at Southampton, Gibraltar, Genoa, Alexandria (for Cairo and the Pyramids), Jaffa, Beirut (both for the Holy Land), Constantinople, Athens, Malta, Naples, and Lisbon. The pronounced success of this venture gave the lead to desperate shipping companies hit by the economic blitz, and they began to develop the popular cruise.

Norddeutscher Lloyd, usually spoken of as the Lloyd, was perhaps even more famous. Established in Bremen in 1856, this line was for many years the keenest competitor of Cunard for the honour of holding the coveted Blue Riband of the Atlantic.

Their series of fast liners began in 1897 with the *Kaiser Wilhelm Der Grosse*, of 14,349 tons, and *Kaiser Friedrich*, of 12,481 tons, and in 1901 the liners *Kronprinz Wilhelm*, of 14,908 tons and 23 knots, and the slightly faster *Kaiser Wilhelm II*, of 19,361 tons, held the supremacy and continued to do so until the Cunarder *Lusitania* entered the race in 1906. The history of this struggle at the turn of the century to capture the Atlantic trade is one of fierce rate-cutting and unscrupulous competition, for both the HAPAG and the Lloyd, while engaged in an internecine rivalry, used all the resources of their Government to handicap their foreign competitors in the Continental emigrant business. Moreover, the Lloyd opened services to Australia and the Far East, and bought up the Scottish-Oriental Company and the East Indian Ocean Steamship Company to extend their connexions. Though in 1914 the tonnage of the German mercantile fleet was only a quarter of that under the Red Ensign, it was more than two and a half times that of any other country, and Germany had risen to second place among the merchant navies of the world.



A Model of the White Star Liner R.M.S. *Majestic* (56,500 Tons)

This ship, which was secured as reparations to the White Star Line in 1924, is the former *Bismarck*, built originally for HAPAG.

By courtesy of the Science Museum, South Kensington

Like HAPAG and other German Lines, the Lloyd suffered disastrously after the First World War. From possessing a fleet approximating 750,000 tons in 1914 they were left without a single ocean-going ship in 1919, and the Commodore of the Norddeutscher Lloyd fleet found employment as captain of a Hamburg ferry. The cheerful, imbecile formula, "Germany will pay," echoed in the demand for reparations. Germany did, and saddled her ships on the victorious Allies, while our financiers pumped money into Germany to help her to re-establish herself to pay these reparations. Industry in Britain slowed down. Shipyards stood idle, mass unemployment became a fixed feature of our civilization. Germany was working, and her shipyards were busy. By 1928 the Lloyd had put into service the two magnificent fifty-thousand-ton ships, the *Bremen*

S.S. DEUTSCHLAND (16,500 TONS)

[illegible] was built at Stettin

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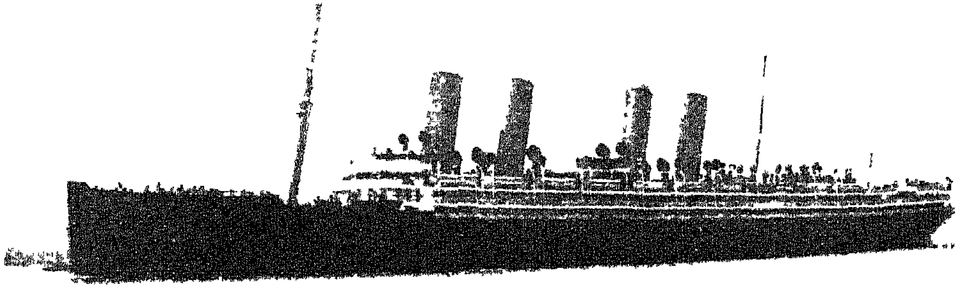

THE NORDDEUTSCHER LLOYD S.S. KAISER WILHELM DER GROSSE (14,349 TONS)

This was the first of four fast liners built in Germany for the North Atlantic [illegible]

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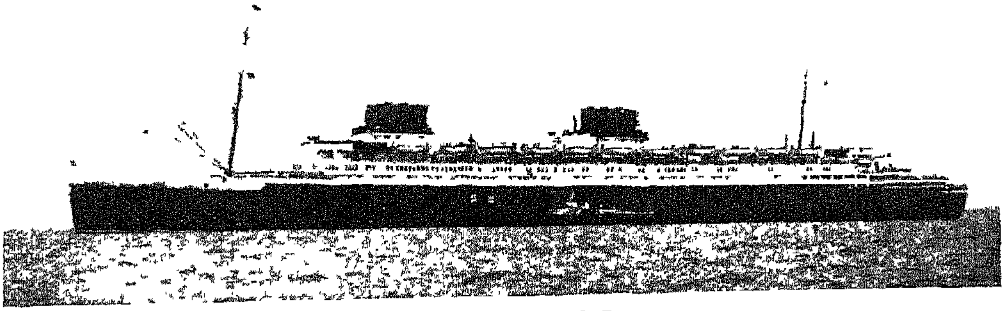


T.S. EUROPA (49,746 TONS)

This ship was built for the Norddeutscher Lloyd by Blohm and Voss, Hamburg, and, with her sister ship, T.S. *Bremen*, was the fastest ship on the North Atlantic from 1929 to 1935. She has now been handed over to the C.G.T. (French line) as part of the reparations from Germany and renamed *Liberte*

Photo Beken and Son, Cowes

and *Europa*, which rewon for the line the Blue Riband. With Government encouragement and assistance, by seeking co-operation in the early stages chiefly with American capital, and making alliances with American Lines—Lloyd allied itself with the U.S. Mail Line, while the Hamburg-Amerika entered into arrangements with Harriman's United American Line—by able direction and ruthless policy, the German steamship companies made wonderful recoveries, and entered again into competition with new ships embodying the latest developments in building.

It is quite impossible within the limits of a chapter, or even of a volume, to tell the complex history of the steamship, and one can only follow the Ariadne thread of the chief developments, and these as mainly confined to the transatlantic service. Not that the routes over the Western Ocean are the most important, though admittedly the services on these routes are the most spectacular, but because the nature of the international competition for speed, with the vast resources employed, has developed the very finest work of both engineer and designer. No better account of the history of transatlantic shipping is to be had than Mr Frank C. Bowen's authoritative work, *A Century of Atlantic Travel.*

The passing of the Dillingham Act of 1925, which stopped emigrant traffic, had a marked influence on the comforts on a ship. A new class, "tourist third," which soon became "tourist," came into existence, and with it the selling attraction of accommodation. Passenger accommodation becomes the first consideration, and a look at a modern power-ship engaged in passenger services shows how everything is subservient to that end. Apart from the funnels, masts, navigating bridge, and forecastle-head, all that is to be seen—port-holes, covered decks, batteries of ventilators, tiers of boats—are directly concerned with the passengers, for without their goodwill and appreciation the passenger ship, be she a liner or a cross-Channel ferry, cannot keep the seas. She is good to look at and good to sail in. How shall a man describe her as she rests beside the quay? The long, clean sweep of her hull with its proud sheer, the bright painted funnels softly smoking, the sparkling white upperwork, the spotless expanse of her tiered decks, the power and the grace of her—

That rushes like a diver to the leap,
And is all beauty without spot or peer,
Built on the Clyde, by men, of strips of steel
That once was ore trod by the asses' heel.

JOHN MASEFIELD, *The Pathfinder*

CHAPTER XII

BLUE RIBAND

(1840 TO 1939)

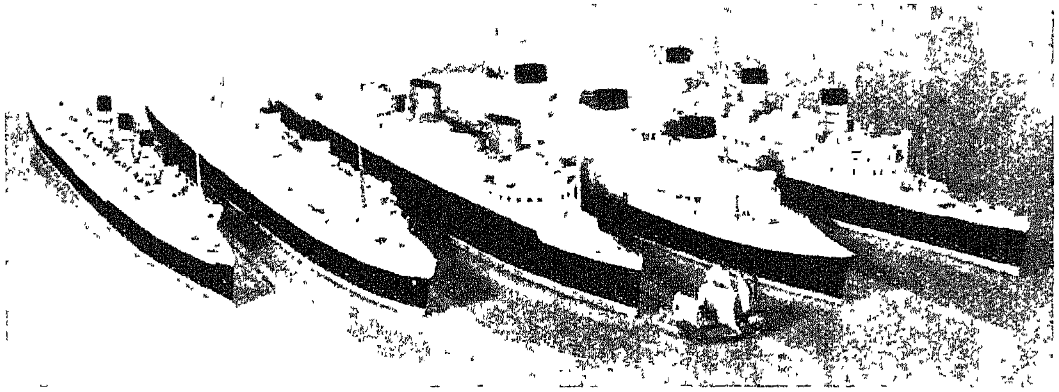
Famous Atlantic 'Greyhounds'—The *Mauretania*—The *Bremen* and *Europa*—Ship Decoration—The Building of the *Queen Mary*—The *Queen Elizabeth*—Some Problems of Accommodation—Some Transatlantic Records

> But why drives on that ship so fast,
> Without or wave or wind?
>
> COLERIDGE, *The Ancient Mariner*

PERHAPS there was no event that so spectacularly exhibited the characteristic spirit of the nineteenth century—its genius for the applied sciences, its aggressive and frenzied competition, its passion for speed, and its ostentatious display of wealth—than the race across the Atlantic to gain the Blue Riband. There was taste, but most of it was bad, and any reflection of it on the luxury-liners was neither better nor worse than what was to be seen ashore. For the arts, especially the pictorial and plastic arts, and that of the theatre, which registers the common appetite more faithfully than any other form of expression, up to the middle of the century had fallen into an almost unparalleled state of degradation.

We are now in reaction against that century, and it has become fashionable to denigrate the Victorians. But it was an age of great achievements. The Pre-Raphaelite movement, founded in 1850, rescued painting from the sentimental inanities, and William Morris in the seventies began to purge the ponderous ugliness of the period. In literature, both in prose and poetry, it produced an efflorescence of genius not matched since the time of the Elizabethans, and in science and invention it outstripped every preceding era. Above all, it gave Britain the blessing of a long period of unbroken peace. With all its faults it succeeded in arousing the public conscience, and so many of the humanizing reforms and ideals in social and international politics that the twentieth century calls her own have their roots in the nineteenth century. The introduction of Ibsen in the eighties to the theatre, together with the clarion challenge of Shaw, Galsworthy, Granville Barker and their school, exposed the hypocrisies and smug optimisms and rattled the prevailing complacencies. It was the Victorian social thinkers and reformers who pointed the way of human progress. The just criticism is not that the Victorians did not move, but that they did not move far enough. The demon of pride and the sluggishness of material prosperity created a solid opposition against translating their ideals into practice. The slow march of "precedent to precedent" satisfied them. Meanwhile all over Europe national jealousies of Britain's prowess were aroused, and envy of her wealth and her standards of living. It stimulated a counter-challenge in their defence. Did not the race for the Blue Riband reflect it?

All the dynamite of intense nationalism, with its pride and sensitive prestige, of conflict to secure power and material advantage, of ruthless self-interest and aggrandizement, that was to explode and shatter a world was activated by this commercial rivalry. The Blue Riband was a symbol of the race not only of ships across the Western Ocean but of mankind to win glittering prizes. Society itself was conceived as simply a conflict for power which presented every question in a form that admitted no answer but violent challenge Such is the essence of nihilism.



A GROUP OF WATER-LINE MODELS OF ATLANTIC BLUE RIBAND HOLDERS

From left to right they are the Cunard Liner (old) *Mauretania*, the Italian Liner *Rex*, Norddeutscher Lloyd *Bremen*, French Line *Normandie*, Cunard-White Star *Queen Mary* In the foreground is a model of the ship of Christopher Columbus All the models were made by Bassett-Lowke Limited and built to the same scale of fifty feet to one inch or one sixth hundredth of the actual size

This philosophy spread in the wake of Industrialism and the growth of dollar empires, and commercial imperialisms prevented any reliable intercourse between nations. Competition was no longer confined to individuals; it raged between peoples, and all their resources of energy and their financial strength were called up and marshalled for the struggle. To consider the event of the race for the Blue Riband merely as an exciting, sporting Marathon on the Atlantic is to see only its superficial appeal. It may have had this praiseworthy virtue for the officers and men who sailed the ships, for the engineers and designers who built the ships, and for the general public who cheered their records, but beneath that ding-dong battle forces were at work which recognized none of the codes of sportsmanship. Governments were thinking of cruisers not liners

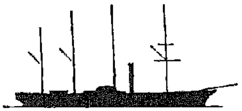
Development of the Transatlantic Liner

This transatlantic trade that was the spur to the development of the most striking type of ship, the crack passenger liner—though it only represents one section of a great industry developing its ship-design to meet the demands of all the world routes and all the purposes for which vessels are required—held the biggest rewards. The ever-increasing market in North America, the emigrant trade, the interchange of manufactured goods and raw materials, the links with English-speaking peoples, the colonial expansions to the West, the coming and going between the Old and New Worlds, and the demand for speedier and more comfortable transport—all these factors led to a concentration on the Western Ocean routes But the Atlantic, with its heavy weather, demanded a high efficiency, and speed meant more journeys and a saving in ships to maintain a regular service, and as speed made a potent appeal to passengers it was profitable to develop it Marine engineers and designers, accepting the challenge, built bigger and bigger, and faster and faster ships.

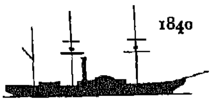
It is impossible, unless the chapter is to be cluttered up like a catalogue, even to name all the famous shipowners and their ships, much less tell the story of their rivalries and achievements on the Atlantic since the days of the Boston sailing-packets. First stands the name of Samuel Cunard, the Nova Scotian sailing-ship owner, who boldly entered into the Atlantic steamship trade in 1840 and founded a company that still stands first on the Western Ocean. Challenged continuously, and often compelled to yield the palm, Cunard have never accepted defeat In the fifties the ill-fated American-owned Collins Line, with their magnificent fleet of paddle-boats, *Baltic*, *Arctic*, *Atlantic*, *Pacific*, and *Adriatic*, made the fastest crossings.

It is interesting to note that the termination *ic* of the Collins' ships was later adopted by White Star, now combined with Cunard in the great Cunard-White Star group. In the seventies White Star, who also originally were sailing-ship owners, for a brief while captured the Blue Riband, but they made a special feature not of speed but of luxury-travel. Dickens's caustic remarks in *American Notes* on the discomforts of the early steamers are well known. The *Oceanic*, built by them in 1871, placed the saloon amidships, and provided wide port-holes and electric bells. The first great challenge to Cunard came from the famous twin-screw Inman Liners, *City of Paris*, later renamed the *Philadelphia* (which held the record in 1889, and again in 1902), and her companion, *City of New York*, another 10,500-ton thoroughbred, held the Blue Riband right down to 1897. White Star, with the *Teutonic*, in 1891, made record east to west and west to east passages, but the honours went in turn to the Cunarders *Oregon* in 1884, next year to the fine 7718-ton *Etruria*, and *Umbria*, which were creating records until 1906, the largest and fastest single-screw liners ever built. These two ships touched the high-water mark of the single-screw liner, and both suffered badly from broken shafts. Next came the 12,950-ton *Campania*, which could do an average of over 20 knots, and her sister, *Lucania*, which, on her maiden voyage in September 1893, won the Blue Riband by making an E-to-W passage in 5 days 15 hours 47 minutes at an average speed of 20·45 knots. These were the first liners to print a daily newspaper.

The next challenge came from Germany First the Norddeutscher Lloyd *Kaiser Wilhelm der Grosse*, of 14,349 tons, crossed from the Needles to Sandy Hook, a distance of 3050 nautical miles in 5 days 22 hours 45 minutes, averaging 21·4 knots, and in 1902 she had shortened her time to 5 days 15 hours, doing 22·84 knots. The Hamburg-Amerika Line answered their great rival of the Lloyd with the 16,502-ton *Deutschland*, which won the race in 1900 and 1901, but she proved a failure because of her extravagant

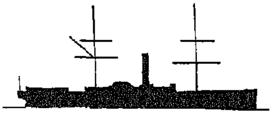


1838 “Great Western” (British) 1340 Tons
Speed 8·2 Knots

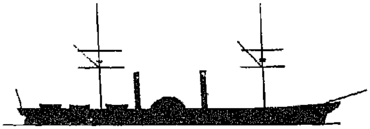


1840

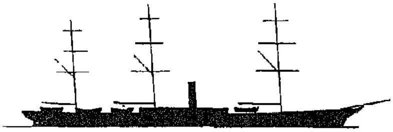
“Britannia” (British) 1154 Tons
Speed 8·5 Knots



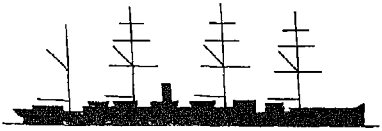
“Baltic” (British) 3000 Tons
Speed 13 Knots 1850



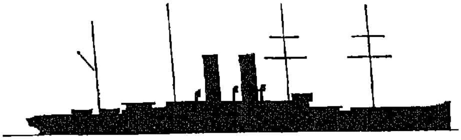
1864 “Scotia” (British) 3871 Tons. Speed 13·5 Knots



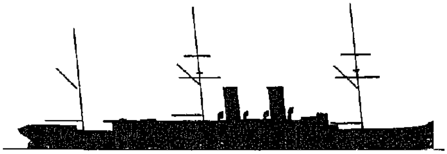
“City of Brussels” (British) 2393 Tons
Speed 14 Knots 1869



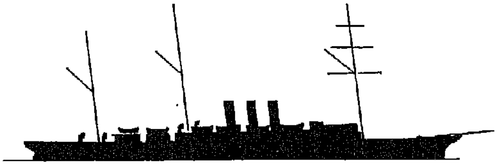
1872 “Adriatic” (British) 3888 Tons. Speed 14·5 Knots



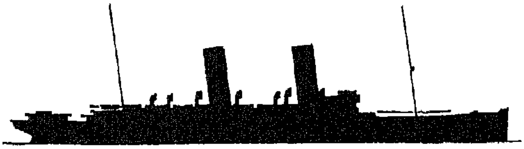
“Oregon” (British) 7375 Tons. Speed 18 Knots 1883



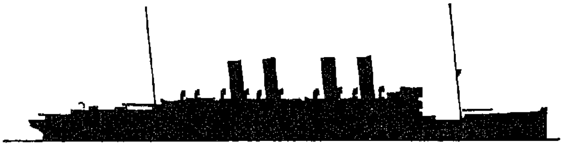
1885 “Etruria” (British) 7718 Tons. Speed 18·50 Knots



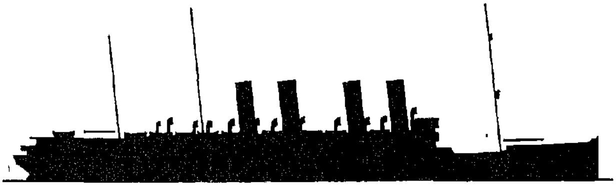
“City of Paris” (British) 10,500 Tons. Speed 21 Knots 1888



1893 “Lucania” (British) 12,952 Tons. Speed 22 Knots



1898 “Kaiser Wilhelm der Grosse” (German) 14,349 Tons. Speed 22·70 Knots

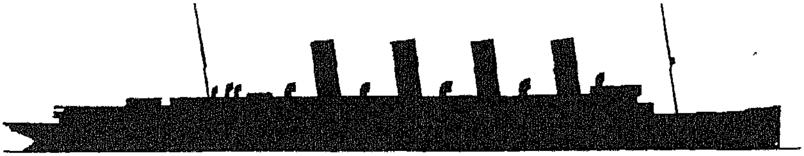


1904 “Kaiser Wilhelm II” (German) 19,361 Tons. Speed 22·73 Knots

BLUE RIBAND HOLDERS OF THE NORTH ATLANTIC

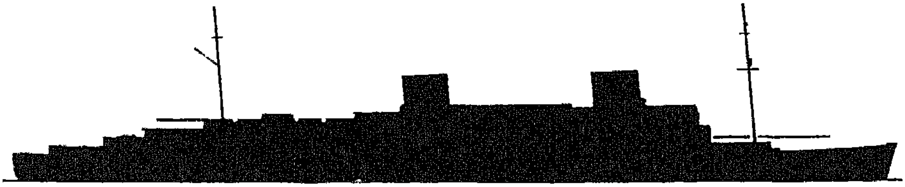
All the silhouettes are drawn to the same scale.

1907



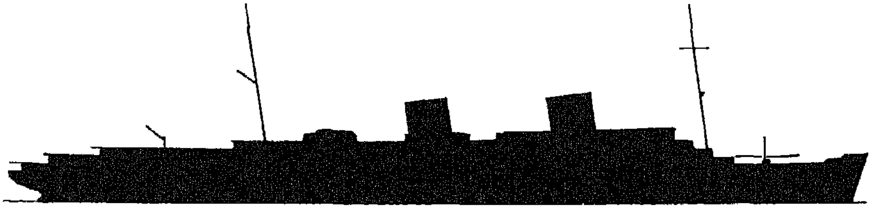
"Mauretania" (British) 30,700 Tons. Speed 27·22 Knots

1930



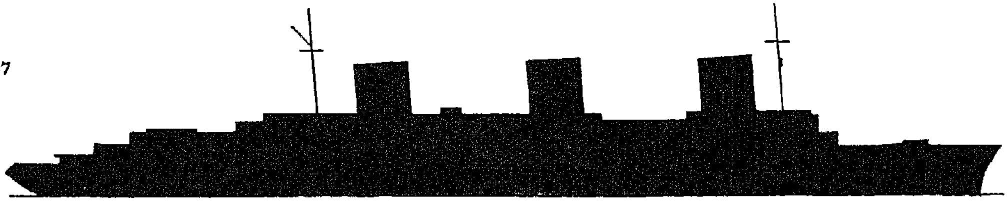
"Europa" (German) 49,746 Tons. Speed 28·51 Knots

1933



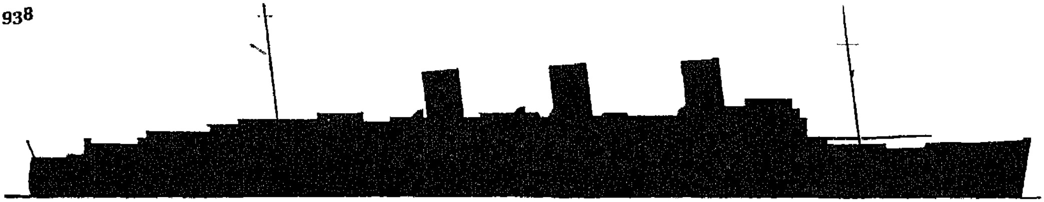
"Rex" (Italian) 51,062 Tons. Speed 28·92 Knots

1937



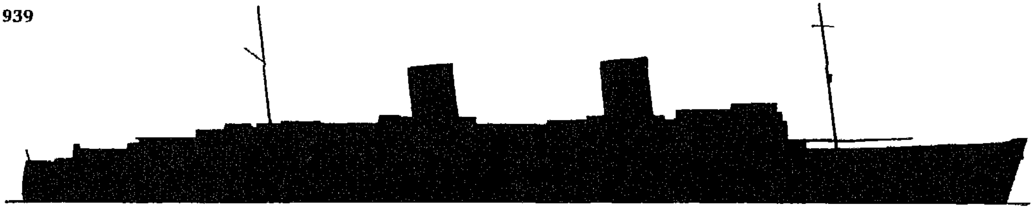
"Normandie" (French) 83,400 Tons. Speed 31·20 Knots

1938



"Queen Mary" (British) 81,200 Tons. Speed, 31·69 Knots

1939



"Queen Elizabeth" (British) 85,000 Tons. Speed ?

fuel-consumption and excessive vibration. HAPAG had to yield the palm to the Lloyd, who followed with their 14,908 *Kronprinz Wilhelm*, which in the following year beat the *Deutschland*, while the *Kaiser Wilhelm II*, of 19,361 tons, in August 1903 broke both east and west records, attaining on the east-bound crossing a speed of 22·73 knots. Like the White Star, HAPAG did not specialize in great express liners but concentrated on size and moderate speed as a general policy.

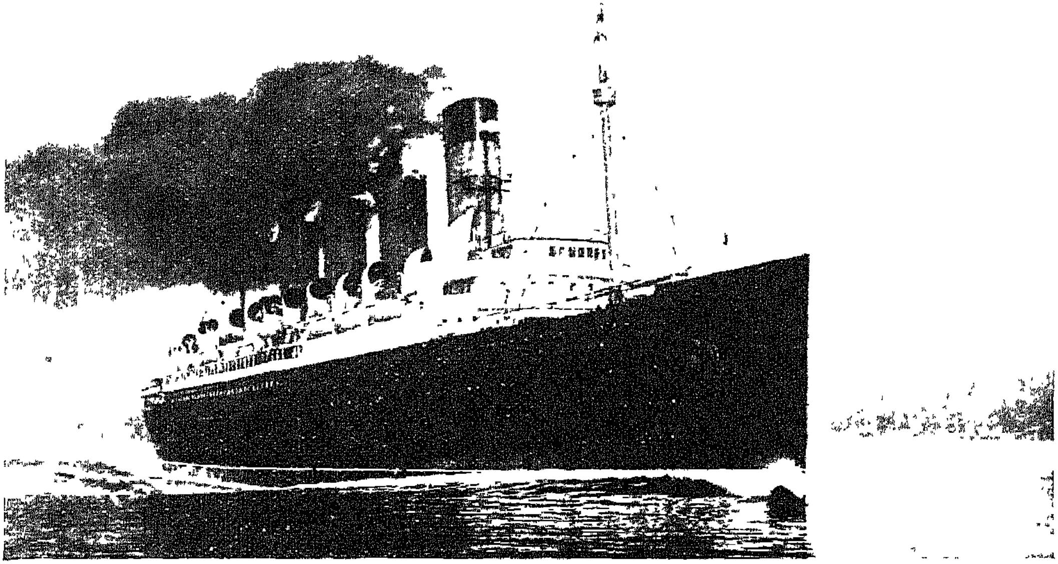
It must be remembered that many famous lines were engaged in this Atlantic service which, though they do not figure among the Blue Riband-holders, were sharing the important trade. Some of these were the American Line, founded in 1871—the mother company of the great American Trust, to be founded thirty years later by Pierpont Morgan—which featured its safety appliances, the Anchor Line, sailing from Glasgow to New York, the Dominion, Beaver, and Allan Lines on the Canadian Service, the Compagnie Générale Transatlantique, which held the French Government's mail contract, the Carr Line, which introduced the twin-screw to the Atlantic, the Red Star Line, the National Line—the list is by no means exhaustive. And there was one agreement between Cunard, White Star, Inman, Guion, and the National Lines made in 1891, noted by Mr Frank Bowen in his comprehensive history of Atlantic travel, which was that the liners of these companies would keep to definite trade-lanes, thus minimizing the risks of the crossing.

Cunard, who for so long had held the trophy at the opening of the century had suffered a temporary eclipse, but came back with two ships built to a scale that had not yet been thought of. Steel hulls for twenty years had proved their superiority over iron, and the revolutionary propelling device developed, though not invented by the Hon. C. A. Parsons, which had been successfully pioneered on the Atlantic by the Allan Line, pointed to the next move. There was another urgency, already noted, apart from the prestige attaching to the Blue Riband, about which Britain herself was anxious, and that was the fear, arising out of the monopoly exercised by the gigantic American Shipping Trust—the International Mercantile Marine—that we should be left without our reserve of auxiliary cruisers. With ready Government assistance Cunard built the *Lusitania* and *Mauretania*, new ships in every sense of the word, new in type and conception, the biggest and fastest ships afloat.

The "Mauretania" and "Lusitania"

The *Mauretania*, built on the Tyne at the yard of Messrs Swan, Hunter, and Wigham Richardson, and the *Lusitania*, her sister, built by John Brown of Clydebank, were each over 30,000 tons, and each had four propellers driven by two high-pressure and two low-pressure turbines. With their nine decks, excluding the bridge-deck, high free-board and wide sides, towering above the water-line, their impressive size (for they were each 790 feet long, 88 feet broad, and 60 feet deep, with accommodation for over 3000 souls), this magnificent pair proved that within the brief span of a century the long-distance, fast, power-ship had arrived and all its essentials of construction had been mastered.

They outclassed every vessel on the Western Ocean, and the trophy again passed to Cunard. The *Lusitania* was sunk by a German torpedo in 1915 off the south coast of Ireland. The *Mauretania* kept the seas until 1935, and seemed to improve with age, for the change-over from coal to oil-fuel increased her speed, and she held the record for the Atlantic crossing as late as 1929.

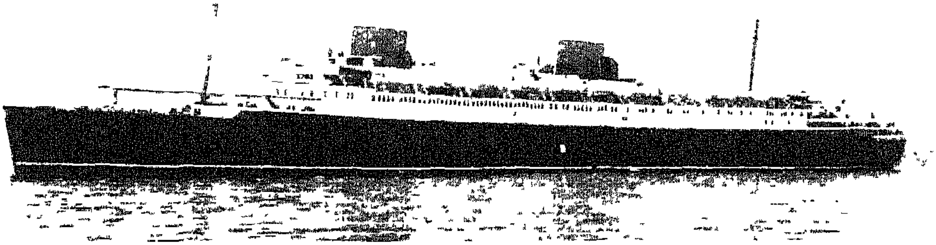


T.S "MAURETANIA" (30,700 TONS)

This liner was built on the Tyne, with Government support, for the Cunard Line in 1907. She was turbine-driven and had quadruple screws. In 1907–29 she held the Blue Riband, and was sent to the shipbreakers in 1935

By courtesy of the Cunard-White Star

More than to any other vessel of all time we owe our position of supremacy in speed on the Atlantic to the *Mauretania*. On her trials she demonstrated her amazing capacity by maintaining a speed of 27·4 knots for over 300 miles, thus well exceeding the 24½ knots specification to meet the requirements of the British Government's contract. She sailed on her maiden voyage to New York on November 16, 1907, and completed the voyage in 5 days 5 hours 10 minutes, at an average speed of 22·21 knots, and lowered this figure on her return trip to 4 days 22 hours 29 minutes, increasing her average speed to 23·69 knots, beating the record of the *Kaiser Wilhelm II.* She steadily improved her performance, until by the end of two years she was crossing the Atlantic at an average speed of 25·03 knots. Through the First World War she seemed to bear a charmed life, daring the perils of mines and submarines, and was never even attacked, and in her war-services she transported nearly 80,000 troops and wounded across the ocean. In 1922 she was completely refitted, and her boilers were converted into oil-burners, and when challenged by the *Bremen* and *Europa*, those new Norddeutscher Lloyd liners who wrested the Blue Riband from her—those 51,000-ton flyers—the “Grand Old Lady” responded to the *Bremen's* homeward figure of 27·91 knots in 1929 with a dash from New York to Plymouth at an average of 27·22 knots, and from Plymouth over to Cherbourg at 29·7 knots, and it is on record that when she was twenty-six years old, in 1933, she steamed over 600 miles at 27·78 knots, and for three hours reached 32 knots. When she sailed on her last trip up the North Sea to the breakers, with her honours thick upon her, she left a name that adorns the page of great achievements. Another *Mauretania* has now been added to the Cunard-White Star fleet. This new 35,000-ton liner has been setting up her own records. She sailed from Fremantle, Australia, to Durban, South Africa, covering the 4000 miles in eight days, the previous best being nine and three-quarter days. She has a greater war mileage than that of the *Queen Mary*, and worthily carries on the tradition of the “Grand Old Lady.”



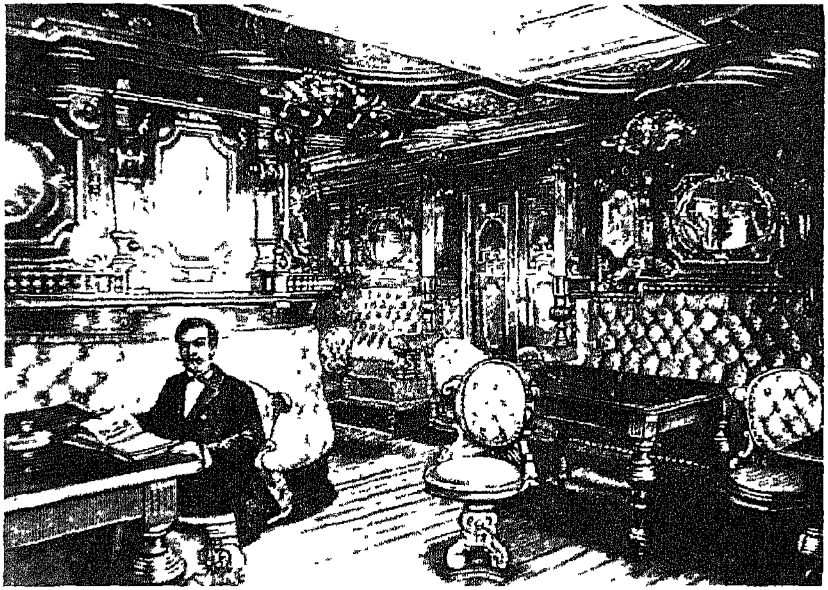
T S “BREMEN” (51,655 TONS)

This liner was built in the Weser Yard, Bremerhaven, and made her maiden voyage in July 1929.

Photo Beken and Son, Cowes

Among the earlier and more famous post-war vessels engaged on this Atlantic service were the Cunarder *Aquitania*, built without Government assistance and designed to pay on a commercial basis, for she was nearly half as big again as the *Mauretania*, had a larger carrying-capacity both of passengers and of cargo, and, while she could maintain an average speed of 24½ knots, she had 4000 horse-power less, for every extra knot of speed is costly. Her beauty of proportion and line won for her the title of “Yacht of the Atlantic.” A veteran of the two wars, the last four-funnelled liner afloat, during her thirty-one years' service she has voyaged 2,660,394 miles. She is now to be replaced.

The *Olympic*, of the White Star Line, built in 1911 by Harland and Wolff, rather bigger than the *Aquitania*, won praise for her comfort and reliable service, for she was designed not only for economical running, with her ingenious combination of four-cylinder, triple-expansion reciprocating engines and low-pressure turbine, giving an average speed of 23½ knots, but after the disaster on April 15, 1912, to her sister, the *Titanic*—lost in an attempt to make a record on her maiden voyage with 2224 souls on board, of whom only 711 were rescued—she was completely reconstructed and subdivided into water-tight compartments to give her the maximum degree of safety.



THE SMOKING-SALOON IN A NORDDEUTSCHER LLOYD LINER, CIRCA 1890

Nautical Photo Agency

Besides this popular ship there were the three ex-German vessels, the *Imperator*, which was acquired by Cunard and renamed the *Berengaria*, the unfinished *Bismarck* at Hamburg, which, when completed, the White Star took over and renamed the *Majestic*, and the *Vaterland*, which was secured by the United States Lines and renamed the *Leviathan*—the "Levi Nathan" so favoured by Jewish travellers. These remained the largest ships afloat till the *Normandie* sailed.

The *Bremen* and *Europa*, who now held the honours for Germany from 1929 to 1933, met their first challenge in August 1933, when the 51,062-ton Italian liner, *Rex*, sailed on her maiden voyage with the express intention of breaking the *Europa's* record, which then stood at 28.51 knots. Engine trouble developed, but on her second attempt she made the east-to-west passage at an average speed of 28·92 knots, covering the 3181 sea-miles between Gibraltar and New York in 4 days 13 hours 58 minutes, and she also surpassed the existing west-to-east trip held by the *Europa* by maintaining an average of 27·92 knots, thus gaining the Blue Riband for Italy. This splendid ship was a casualty of the Second World War.

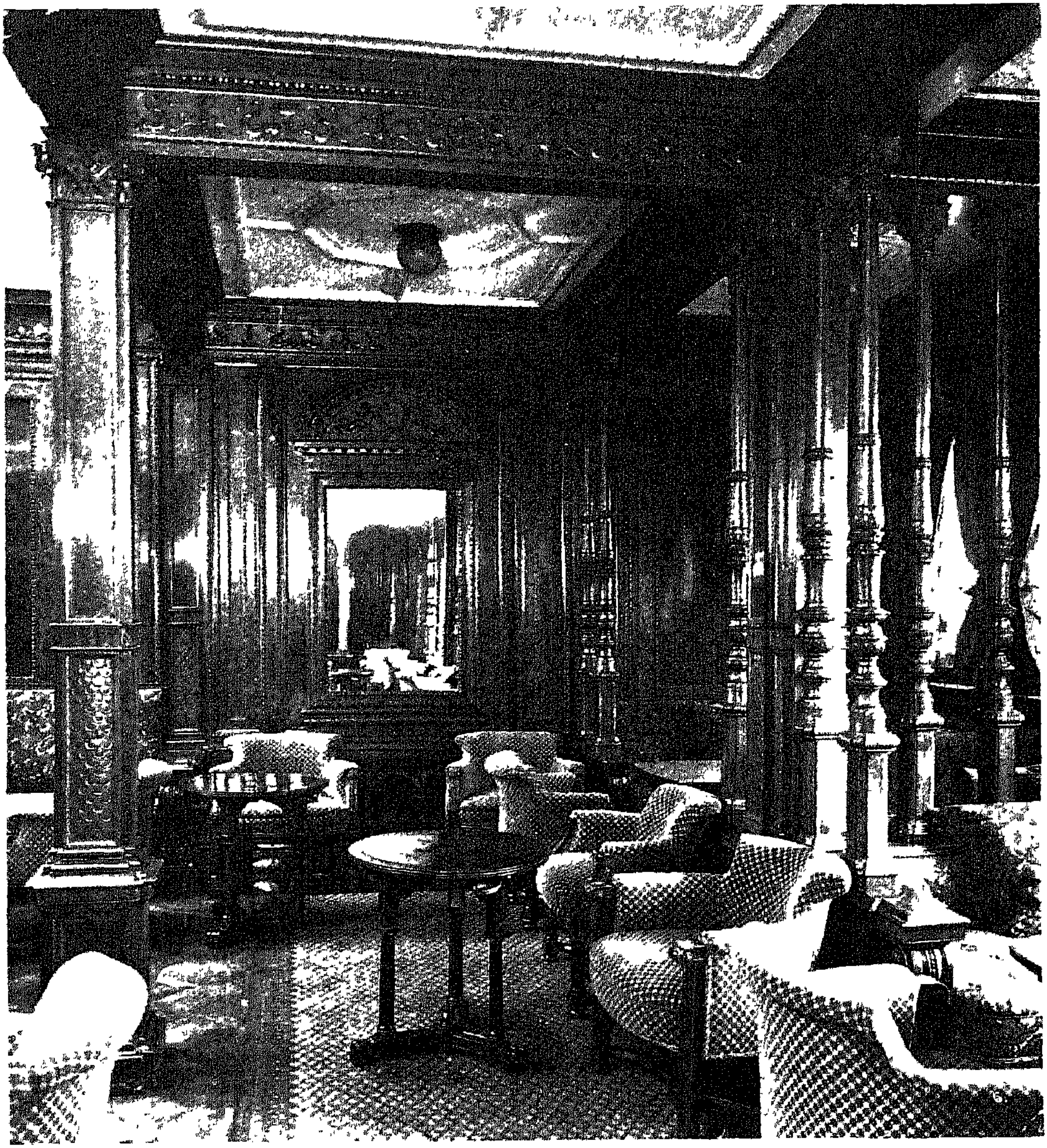
In the production of super-luxury-liners the French commanded the way. The *Île de France* of 1927, with a gross tonnage of 43,158 had good claims to be regarded as the most luxuriously and tastefully appointed vessel for her size on the ocean, though she was run very close by the C.P.R. *Empress of Britain*. This great white vessel was the finest, largest, and fastest ship on the Canadian service, crossing the Atlantic at over 24½ knots, and she won great popularity for her round-the-world cruises. The *Île de France* was the first to use the catapult postal plane, afterwards developed and regularly used by the *Bremen* and *Europa*.

Ship Decoration

At last a break had been made with that tradition of ship decoration which had made the luxury passenger liners a by-word. A ship reflects the age in which it is built, and during that barren period, æsthetically considered, of 'getting and spending' at the turn of the century, when all thought was concentrated on mechanical efficiencies, the decoration on the big ships catering for the moneyed classes was stamped with ostentatious vulgarity. The false economic value given to decoration as something applied to increase selling value was the blight cast by the nineteenth century, and it had its firmest grip on our Grand Babylons, afloat and ashore. Decorations, enrichments, mouldings—all the trappings of Wardour Street—were added in excess to tempt the patronage of the new class of traveller, the wealthy industrialist, and the susceptible tourist in search of what C. E. Montague called "lawful vibrations of conscious contact with past ages." So the passengers on some of our liners had such exhibitions as, for instance, the smoking-room on the reconditioned *Berengaria*, with its recommendation:

> The smoking-room is a truly English feature—a Tudor room with a large open fireplace, the red brickwork over which (as in other parts of the room) realistically reproduces that of the sixteenth century. The bricks in question came from a Buckinghamshire cottage of the Tudor period, which was demolished for the purpose. The work was carried out by a London firm.

The Design and Industries Association, familiarly known as the D.I.A., drew attention to the style of decoration of the Union Castle liners, while the P. and O. *Viceroy of India* advertised its blended period styles—Queen Anne features on the tables, chairs after Louis XVI, and Hepplewhite and Greek and Pompeian adornments. One ship-decorator, who proudly claimed that he had decorated twenty-six ships, likened modern work to modern pornographic literature—a mere attempt to gain notoriety. So the advocacy of modern style in decoration for modern ships was an attempt *pour épater le bourgeois*! The truth is that period furnishing is 'safe,' requiring little thought or imagination, and it can be bought almost by the yard. Is it what the public wants? No traveller refuses to book his passage in a ship that suits his convenience in other matters because he prefers the 'cosiness' of period furnishing. Even the American with supposed passion for 'ye olde' booked his passage in the *Bremen*, the *Nieuw*



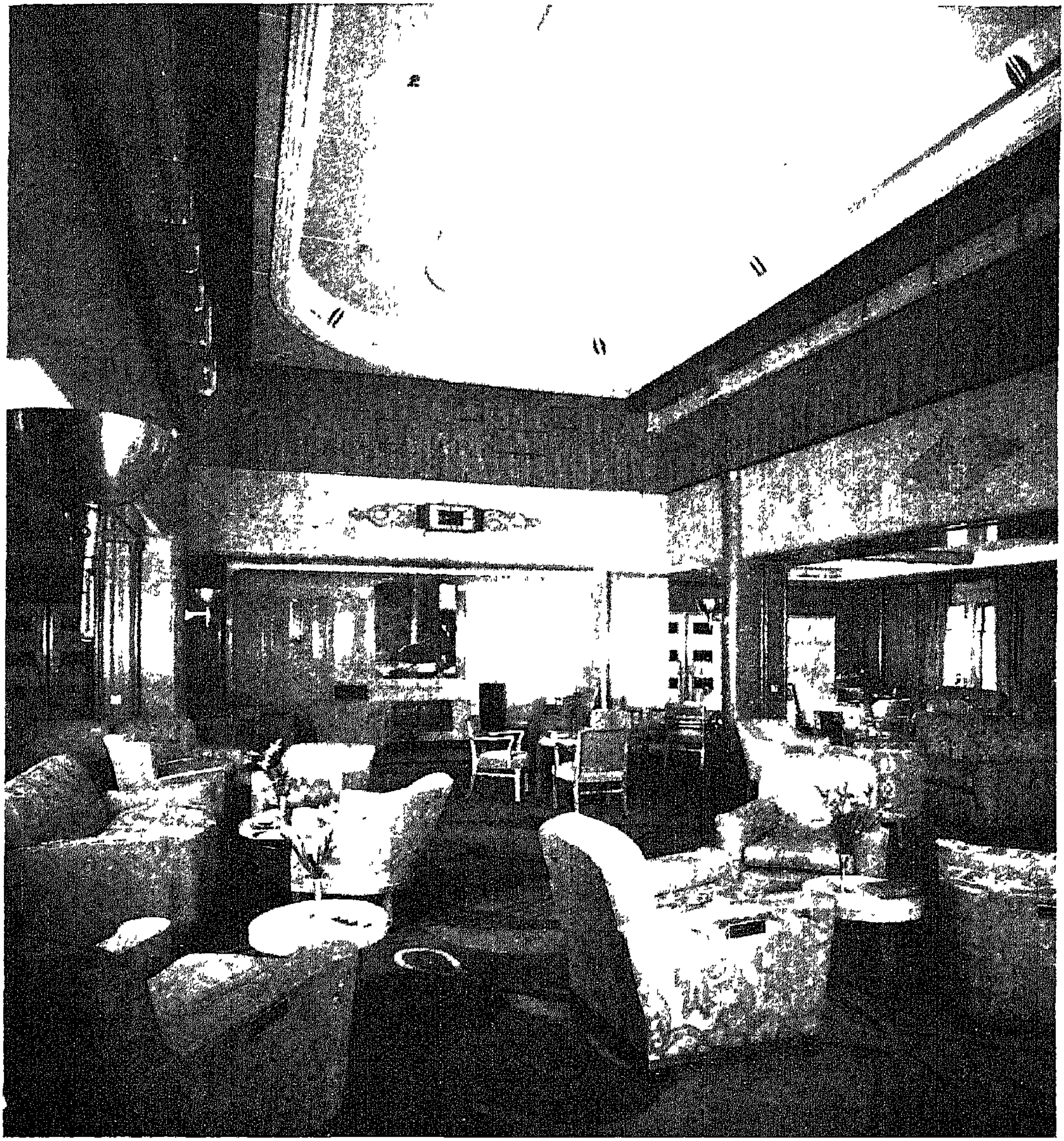
THE CABIN-CLASS SMOKING-ROOM IN THE OLD "MAURETANIA," 1907

By courtesy of the Cunard-White Star

Amsterdam, the *Normandie*, or the *Queen Mary*, all of which are modern in the full sense of the word.

Where are there better fields for contemporary decoration than our modern ships? The lines of a ship are all horizontal and utterly opposed to the perpendicular quality of period decoration. Ships' decorators always have a struggle to gain height, but the stuff used has a feeling of weight. But as the steamship passed through its essential stages of development as a power-driven vessel, more consideration was given to its appointments and furnishings, and a keener æsthetic sensibility, in harmony with the renaissance of artistic movements making themselves felt in architecture, painting, and design, began to reflect itself in the decoration of liners. The Canadian Pacific in their Duchess ships boldly broke away from "the rag-bag of ancientry." The Orient liners *Orion* and *Orcades* were contemporary in spirit and execution. The *Queen Mary* has been informed with the new spirit of modern treatment, and all the later British liners show their awareness in greater or lesser degree of the changed ideas. A ship is not a museum. It should create the atmosphere of a liveable and distinctive home, even though it be a temporary one, for cultured cosmopolitans. Its decoration should be integral with the structure of the ship, not something stuck on with no relation to anything. It was this approach which characterized the work of August Breuhaus on the *Bremen*; Bergsten, that courageous pioneer on Sweden's fine, German-built motor-liner, the *Kungsholm*; that combination of Dutch designers and decorators who added such distinction to the *Nieuw Amsterdam*, built in 1938 for the Rotterdam-New York passenger- and cargo-service, with intermediate calls at the English Channel Ports; and the team of French architects who supervised the decoration of the *Normandie*. It was this break from the stuffy ornateness and period treatment which gave such freshness and attraction to the Orient liners, *Orcades* and *Orion*, in which an entirely new note was struck in British ship decoration.

France made her bid in the international race for the Blue Riband when, at the end of May 1935, her giant liner *Normandie*, with a length of 1029 feet, a breadth of 119 feet, and 83,400 gross tonnage, proceeded on her maiden voyage, beating all previous performances by making the outward-passage in 4 days 3 hours 14 minutes at an average speed of 29·53 knots. With her, now a rusted hulk salvaged from the Hudson river, a loss in the Second World War, the *Queen Mary* and the *Queen Elizabeth*, which had never been put on the Atlantic service, being called up for trooping, remain the finest developments of the Atlantic passenger-liner. There is something distressing in making comparisons now that the *Normandie*'s career has so abruptly ended, for the *Queen Mary* was Britain's challenge. More than prestige was involved in the holding of the Blue Riband. It is very doubtful whether any line ever built a ship primarily to gain this title. Mostly the advance in speed has been due to the periodic perfection of methods, or the introduction of new ones. It is not the overcoming of the might of the Atlantic that benefits a line but the great advertisement which follows. This brings the line into the public eye and benefits all ships of that line. A specially fine ship not only secures business for herself but brings more traffic to the older vessels of her fleet.

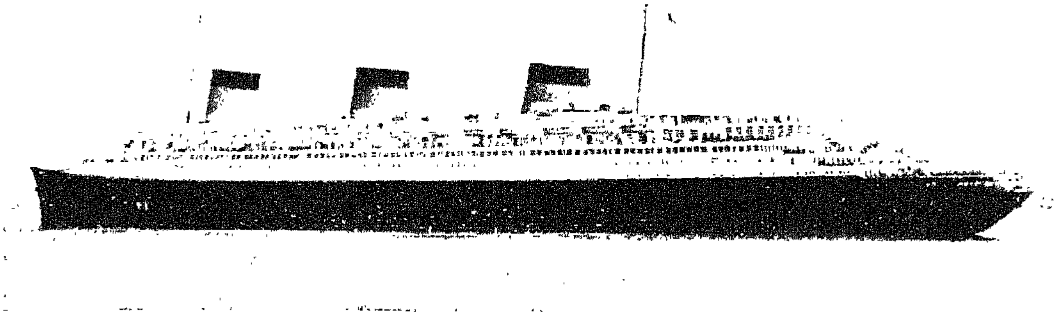


THE "GRAND HALL" (CABIN-CLASS) IN THE NEW "MAURETANIA," 1938

By courtesy of the Cunard-White Star

The "Queen Mary"

Cunard, whose supremacy on the Atlantic was again seriously challenged, took up the gauntlet and planned the building of a new ship big enough and fast enough to compel attention, and they proposed to do it without State help. This was in keeping with the British tradition of independence from State control, though their rivals, the French, German, and Italians, all received generous Government assistance. Such a mammoth vessel as was planned—for her over-all length was to be 1020 feet, and her gross tonnage 81,235—demanded facilities not yet available. The Clyde Trust undertook the further widening and deepening of their river so that she could be launched from John Brown's Clydebank yard, and the Southern Railway built their vast new dock system at Southampton, at a cost of nearly £8,000,000, to meet the needs of such giant ships. It is this remarkable development in port facilities at the terminal Atlantic ports which enables the *Queen Mary* to be received, discharged, turned round, refuelled, and reprovisioned within three days. Unfortunately, before the vessel was finished, and while she was still on the stocks, a paralysing money crisis occurred. The continued depression in trade markets, the mass unemployment which resulted, the financial deficits which ensued, led to a steep rise in interest charges. This pressure from the banks and the money market caused a financial crisis which resulted in the panic of 1931. It was revealed, according to the *Economist*, that over £58,000,000 was frozen in Germany, and the German industrialist was enjoying cheaper and longer credit from the London money market than was being given on overdraft by British bankers to British industrialists. Trade had been slowing down for a decade and prices falling.

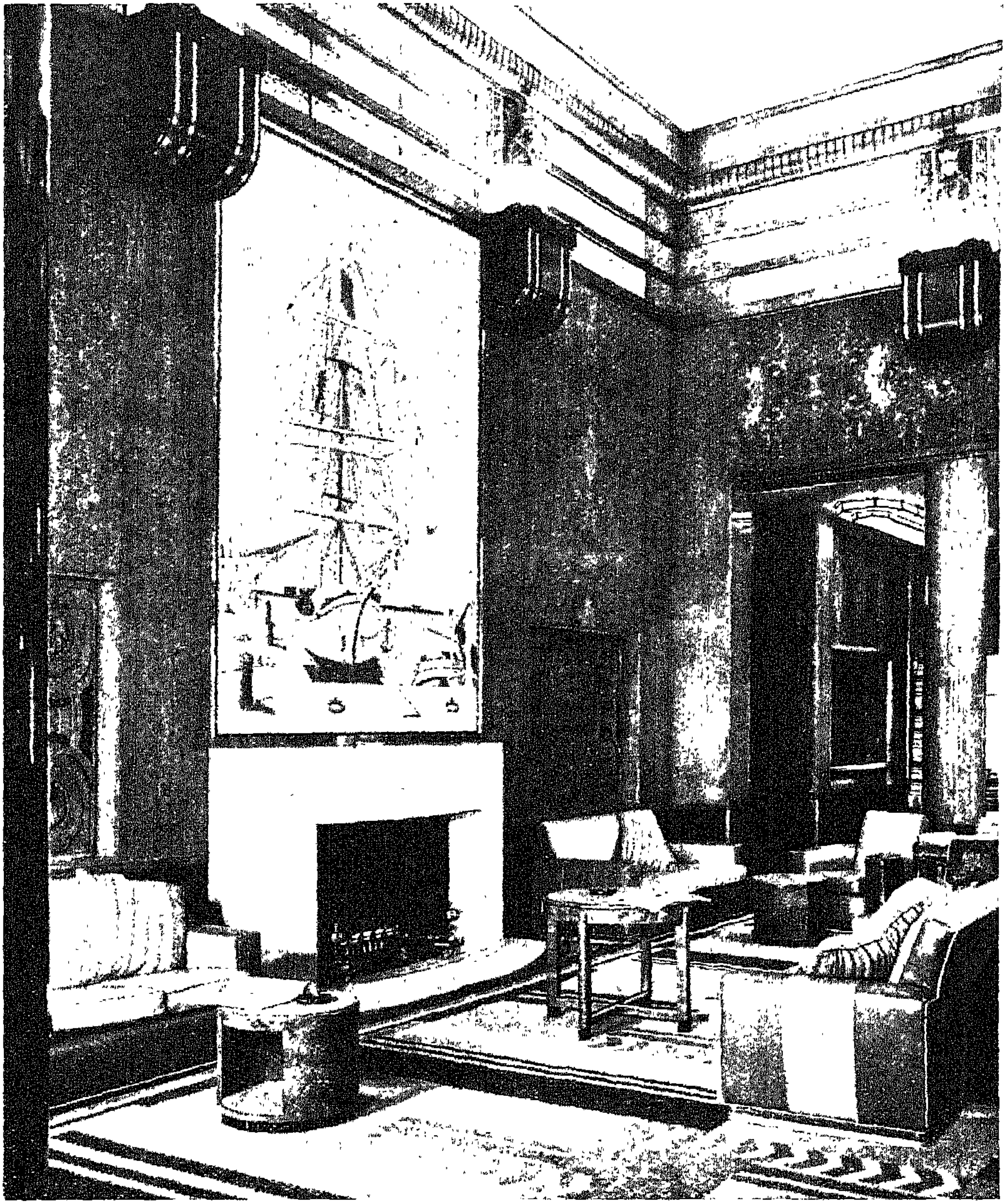


E.S. "NORMANDIE" (83,423 TONS)

This liner, which had a turbo-electric drive and quadruple screw, was built at Saint-Nazaire, and made her maiden voyage in May 1935. Considered the most beautiful of all liners, she was lost by fire in New York Harbour during the war.

Photo Bassett-Lowke

The estimated cost of the *Queen Mary* was £6,500,000, but by the time the contract for her building was signed, December 1, 1930, this price had fallen to £4,500,000. Confidence was shaken. Germany and Austria had depleted our liquid resources, and

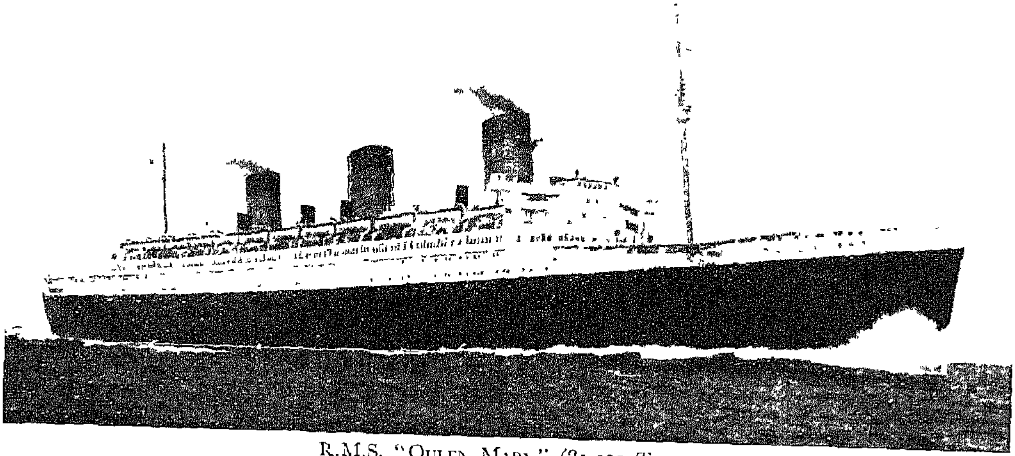


A CORNER OF THE CABIN-CLASS SMOKING-ROOM IN THE "QUEEN MARY"

Here, as in the previous illustration of the "Grand Hall" of the new *Mauretania*, the trend of decoration of the Cunard-White Star ships since the old *Mauretania* (see p. 239) can clearly be seen.

By courtesy of the Cunard-White Star

they had declared themselves unable to repay. Interest charges rose in sympathy with the higher bank rate, and the directors of Cunard were no longer in a position to meet the mounting charges. Thousands of men were put out of work, and to add insult to injury there were not lacking financial experts to lay the blame on the unemployed and the extravagant dole they were receiving. After three years a solution of their mutual financial difficulties was sought in the amalgamation of Cunard with the White Star Line, and a new company was formed with a capital of £10,000,000. The Government came to their assistance, guaranteeing the ship's completion with a loan of £5,000,000 and also the insurance, and so work was started again. The vessel was launched on September 26, 1934, by Her Majesty Queen Mary, accompanied by his late Majesty King George V, and on May 27, 1936, she made her maiden voyage from Southampton via Cherbourg to New York.



R.M.S. "QUEEN MARY" (81,235 TONS)
This liner was built by John Brown, Clydebank, and made her maiden voyage in May 1936.
By courtesy of the Cunard-White Star

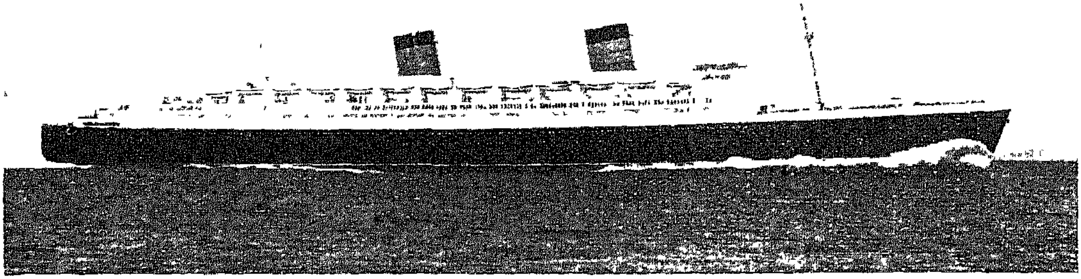
Here was a worthy rival for the famous *Normandie*, and a keen struggle went on between them. The *Queen Mary* set up new records. In August 1936 she set up a west-to-east record of 3 days 23 hours 57 minutes, at an average speed of 30·63 knots. In 1937 she beat the *Normandie's* east-to-west record by crossing in 3 days 23 hours 2 minutes, averaging 30·58 knots, and in 1938 she reduced this time for this voyage to 3 days 21 hours 48 minutes, at an average of 30·58 knots. But though the *Queen Mary* held the coveted prize, it was precariously held, for neither ship in competition for speed had exhausted her resources, and the *Normandie* would have challenged again. The contest between the two ships was most instructive, interesting, and exciting to shipbuilders, naval architects, and marine engineers. For the ships, though almost of equal size, speed, and tonnage, catering for the same type of traffic, over the same route, were of fundamentally different design, and afford an interesting example of how separate groups of engineers and designers tackle the same problems, observe the same phenomena, and arrive at widely different conclusions.

The rival merits of the *Queen Mary* and the *Normandie* created quite strong partisan feelings, but in any comparison between the two ships there is one question which the puzzled observer asks, and that is : "Why is it that the *Normandie*, which had a speed and tonnage near enough the equivalent of the *Queen Mary* for argument's sake, could attain that speed, when her shaft horse-power was roughly one-fifth less than the British ship?" The only satisfactory answer is to be found in the excessive streamlining, so characteristic of the Yourkevitch hulls. This was the reproducing in ship-form the main features of a yacht hull. The water disturbance as revealed by the wash and wake was remarkable by its complete absence of fuss; even travelling at full speed the cut-water was only about six feet high, and there was no more following wave than bow wave. So it was possible for her to make her call at the Ryde anchorage coming up at considerable speed, and her owners never once had a claim for wash-damage. As a shipbuilding expert remarked when he saw her hull ready for launching at the Penhoet shipyard, "Not a straight plate; not a straight plate!"

The *Queen Mary* has a magnificent record of war service, and to her credit stands one of the longest war mileages, for she has sailed over every ocean. Like her sister, the *Queen Elizabeth*, she saw service in the Pacific during the early days of the war, though obliged to sail round the Cape because both ships were too large to use the Suez Canal. She has transported nearly a million troops and steamed one and a half million miles during her war-time commission.

The "Queen Elizabeth"

Of the *Queen Elizabeth* the vital details concerning her speed were kept a close secret during the war. The progress in the science of marine engineering goes on, and each successor profits from the experience of her forerunners. This we know, that in place of the twenty-four boilers on the *Queen Mary* the latest ship of Cunard achieves the same range of speed and power with only twelve boilers. This supreme ship, with her length of 1031 feet, her estimated gross tonnage of 85,000, thirteen feet longer than the *Queen Mary* and nearly five thousand tons greater displacement, with provision for more than 2300 passengers, is the largest and longest vessel ever constructed. She is driven by a system of Parsons' single, reduction-geared turbines, each of the four screw-propellers weighing 32 tons apiece. The four gear-wheels together weigh nearly 320 tons. Steam is supplied to the sixteen turbines by twelve high-pressure, water-tube boilers, the largest ever built into a ship. That is why she has only two funnels against the *Queen Mary's* three. She carries a huge power-station, housing four turbo-generators for supplying power to the auxiliary machinery and 'hotel' services. All the most modern navigational appliances are fitted, including gyro-pilot equipment, a course-recording instrument which automatically registers every alteration, and the time of alteration, echo-sounding apparatus for recording depth of water, electrical equipment on the bridge to operate three deep-toned whistles, an electrical appliance which immediately extinguishes small lamps on the bridge if the navigational lights fail, and a complete service of loud-speakers and telephones. The radio-telephone service fitted in about 500 cabins makes it possible for a passenger to talk direct to any telephone subscriber in almost any part of the world.

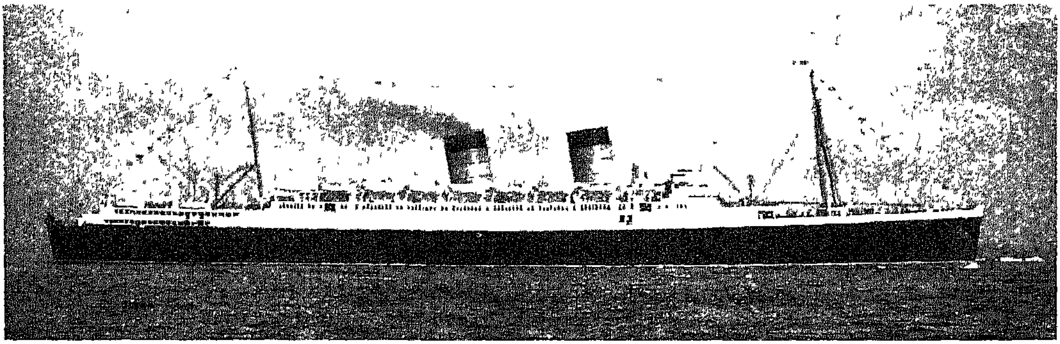


R.M.S. "QUEEN ELIZABETH" (85,000 TONS)

The full details of this liner are not yet published, but she is considered to be the finest, fastest and largest liner in the world. She was built by John Brown, Clydebank

By courtesy of the Cunard-White Star

Radar is also included in the ship's navigation equipment. Radar locates objects which cannot be seen, and is invaluable in a fog. Launched on September 27, 1938, at the yard of John Brown and Company, Clydebank, in the presence of the King and Queen, she was christened by Her Majesty Queen Elizabeth. Like the *Queen Mary*,



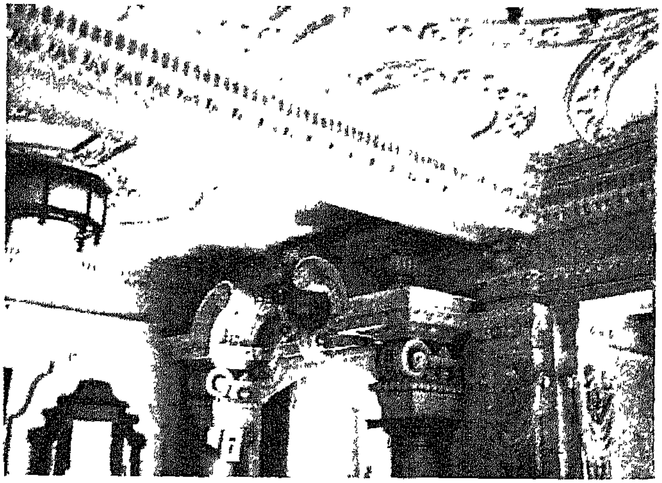
R.M.S. "MAURETANIA" (35,700 TONS)

Built by Cammell Laird, Birkenhead, this liner is the largest English ship to dock in the Thames Her maiden voyage was made in 1939.

By courtesy of the Cunard-White Star

she was built with the Government as financier. She was to have been ready to make her maiden voyage in 1940, but as soon as her trials had been completed the outbreak of war recruited her into a national service hidden from the glare of publicity, a service worthy of the great name she bears which is for ever England.

During the war she completed sixty voyages, steamed about 1,000,000 miles as a transport, and carried more than 800,000 troops. On her demobilization, when she berthed on March 6 at Southampton after her last trooping voyage, Captain Sir James Bisset, R.N.R., Master of the ship and Commodore of the Cunard-White Star Fleet, said of the *Queen Elizabeth*, "She is the best ship in the world to handle," and added, "As to speed, my company do not believe in records, but I can say she has never been opened out. She has done thirty-one knots, and in my view will easily exceed the *Queen Mary's* speed."[1]



A PIECE OF CEILING DECORATION IN THE LOUNGE OF A MODERN BRITISH LINER

Photo Bass [illegible]

On the Atlantic for the most part skies are grey, and the wind is cold. Who would stand on the deck with the ship doing thirty knots and the wind whistling? Enclosed promenade decks give complete shelter to those who wish to look across the grey seas, and there are open sports' decks for the enthusiast. But life on an Atlantic liner is indoors in the great populous halls or the quiet retreats, but below decks. Theatre and chapel, ballroom and library, cocktail-bar and lounge, shops, swimming-baths, nurseries for the children and salons for My Lady of Fashion, dining halls, reception halls, hospitals—all civilization clamped down in a vast steel shell. For the vast majority who travel want to forget the sea, and many there are who, normally living a thousand miles away from the coast, hate the sea. Yet to be above and, as it were, alone with the ship; to watch her stern rear up in a great incline, the whole immense length lifted as she dives into a trough in the waves; or to stand on a quiet night and watch the swing of the funnels and spars in the dusk, with no sound but the soft rush of waters and the clicking of her automatic steering control. Then under that smooth impact of power one feels the majesty of great things Forty thousand tons of steel ploughing the Atlantic. The terrible drive of the mighty engines, the foaming, seething wake under the counter, are witnesses of an implacable power; but there is a power greater still, a power that may be harnessed but not enslaved, a power that cannot be mocked, and men of the sea be they great or lowly never forget it.

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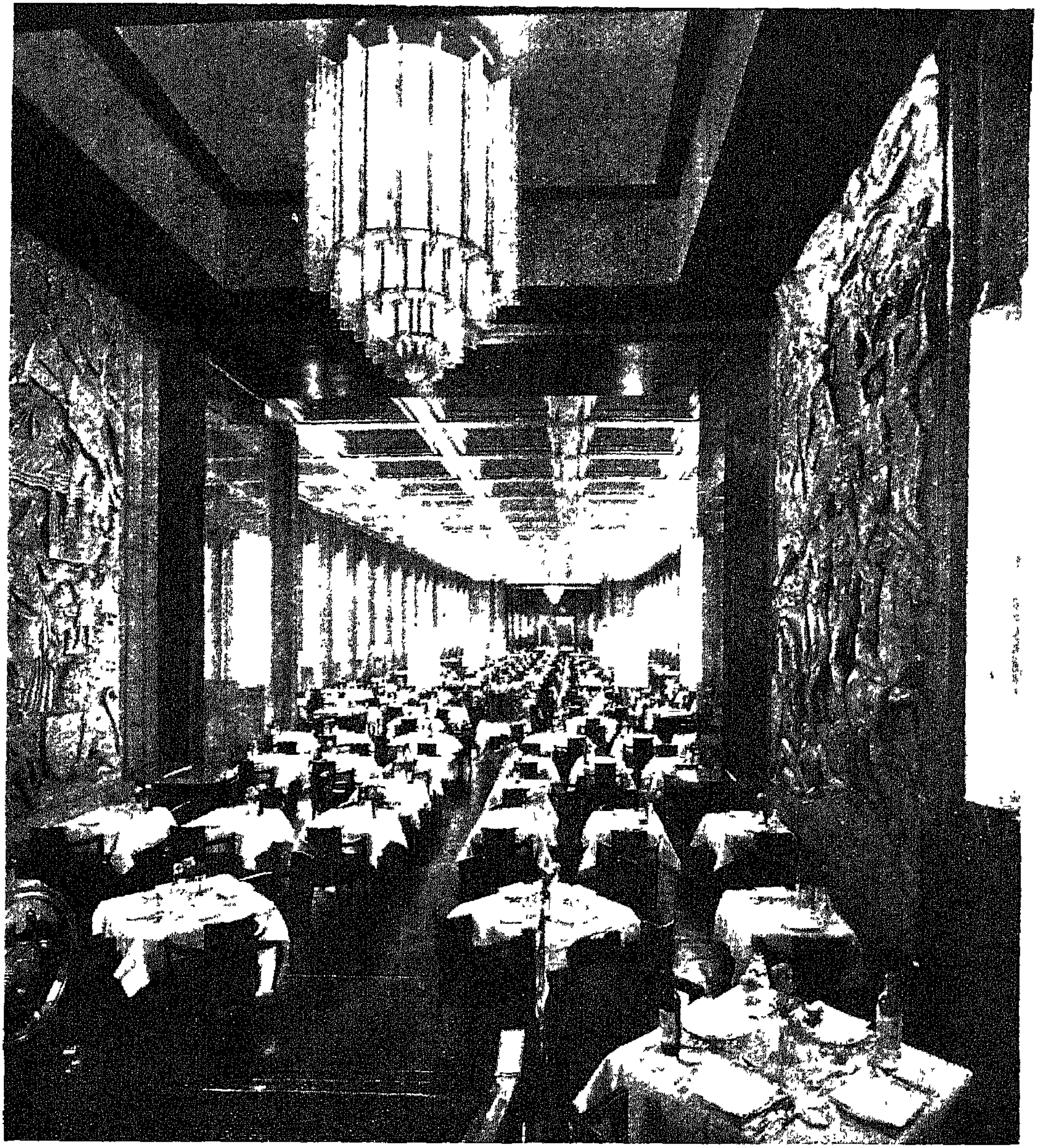
[1] *Daily Telegraph* March 7 1946

Passenger Accommodation on Luxury Liners

A passenger liner is not a floating hotel, though it fulfils that function, which goes some way to explain the vexations of accommodation. In spite of the high level of comfort on our passenger-carrying ships, there is an inadequate supply of single-berth cabins. Not even a third-rate hotel expects you to share your room with a stranger for one night, but you are expected on these luxury ships to take your chance in the shape of a cabin-companion for a five-day voyage across the Western Ocean, costing fifty guineas and upwards. But while the ideal of a sufficiency of single-berth cabins is one to be aimed at, and until the problem is solved the passenger accommodation leaves something to be desired, it is recognized as a perplexing problem.

A ship has to condense its pay-load or else increase its rates. An extra floor on an hotel is not the same proposition, for many reasons, as an extra deck on a ship. Generally speaking a town hotel has an all-the-year-round trade, but not so the average ship. During many months of a year many double-berth cabins become singles out of necessity —for want of passengers. It is not possible to make a comparison in the cost of a room, *per se*, because an hotel does not take its occupants to the ends of the world at speed, and with all the amenities that absence of normal work and play cause an ocean traveller to long for, so that single-berth cabins for most are unavoidably too expensive. There are no cabins for passengers below the water-line. Board of Trade rules forbid it, but big passenger liners with deep draught—shallow-draught vessels could not take the Atlantic weather—are compelled to utilize their space nearer the sea, and so the cheap accommodation being placed there requires the port-hole covers to be almost always in place. Admittedly this is an unsatisfactory solution of the lower space. It should be remembered that, as far as practicable, the deep-down space is used for the public rooms and swimming pools, where people are only there for a short while. Modern science has provided one solution—the several systems of air-conditioning which provide the lower cabins with air often better to breathe than it is on deck amid the fumes, smoke, and smell. These are still unresolved problems.

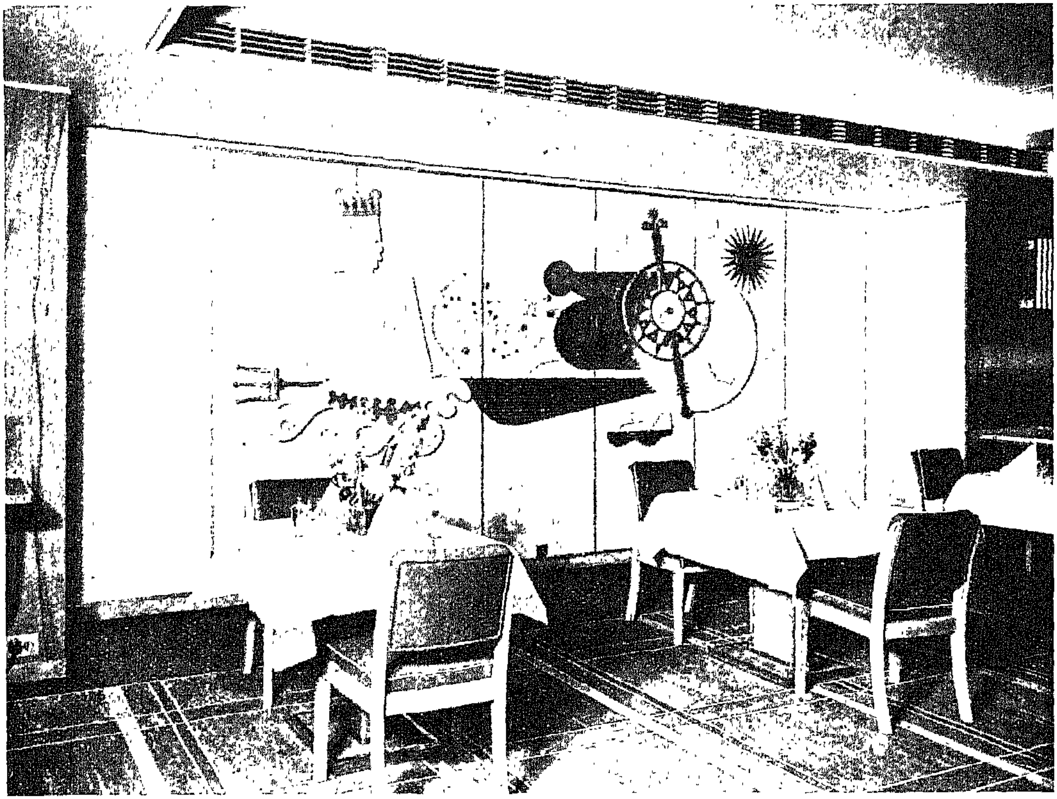
Every inch of space on a ship is valuable, and space-utilization is the ship-designer's chief problem. The *Aquitania* set new standards when she increased her passenger-space to 100 square feet, from a general average of less than half that amount, as an attractive compensation for her lower speed against that of the *Mauretania* and *Lusitania*. The Holland-Amerika Line, which never aspired to the Blue Riband, has made its



THE DINING-SALOON OF E.S. "NORMANDIE"

This magnificent room seats seven hundred diners at one sitting, and leading out of it are eight small dining-rooms for private parties and a banqueting hall seating seventy-two. It is air-conditioned and is decorated by famous French artists.

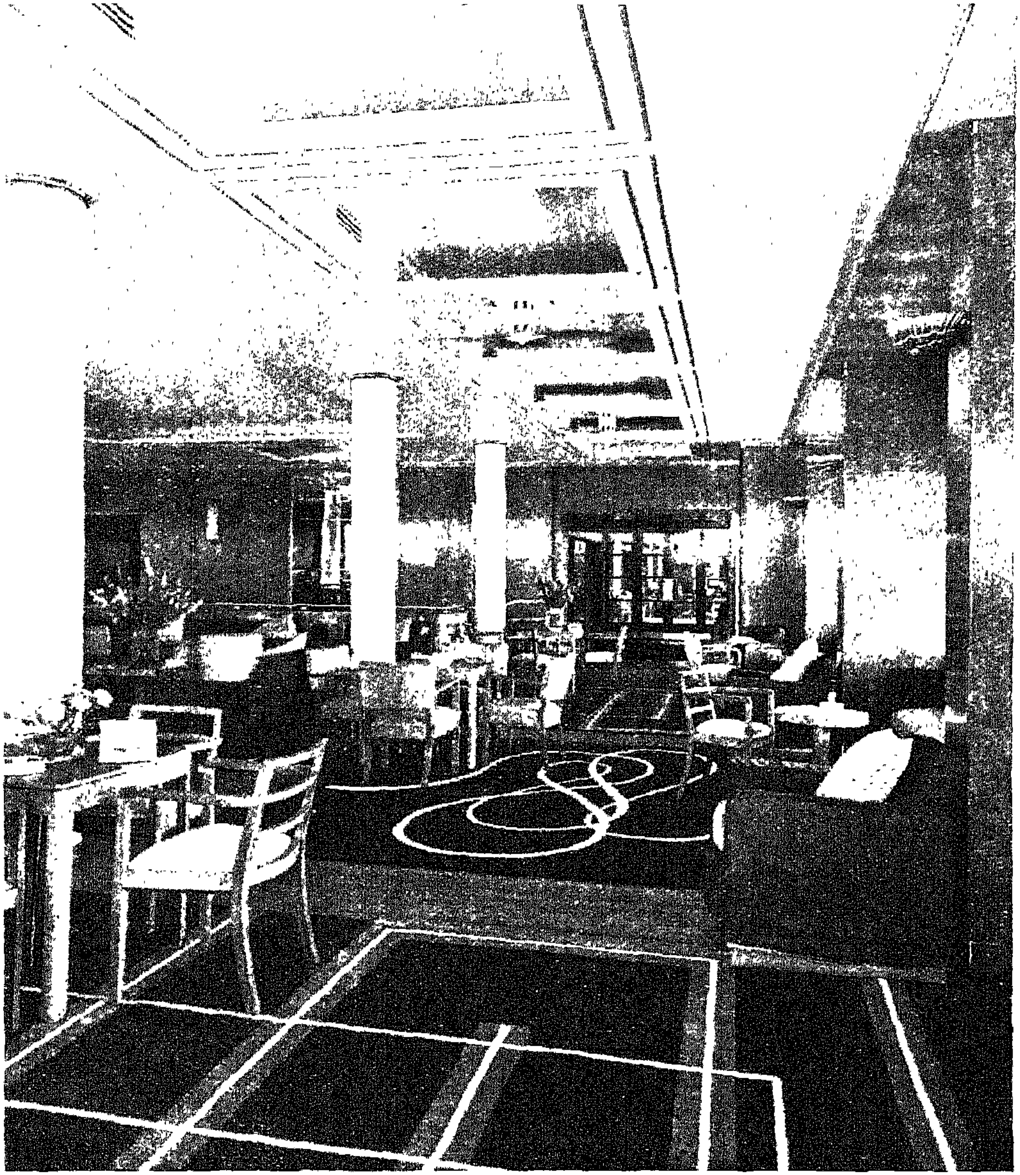
By courtesy of the C.G.T. (French Line) appeal by its comfortable and well-appointed ships. Space on its latest ship the *Nieuw Amsterdam* is generous even for the tourist-class, and she is the first ship ever put into the Atlantic trade with a private bath or shower in every cabin-class room, and she is so designed that there is always a whole deck between sleeping quarters and noisy public rooms. The *Normandie* in her *grand luxe* suites allotted approximately 340 square feet per passenger, though in some of the two-berth cabins it was as low as 70 square feet per passenger. It is almost an insuperable problem to increase the area of passenger space and at the same time provide cheap fares, especially with the steadily increasing costs of shipbuilding. America has pointed one way in the Kaiser prefabricated, mass-produced ship, but the Liberty ship is not the way we can follow. As British shipbuilding under war conditions has found its own solutions by concentrating on standard designs and quantity productions of type and size, so in peace-time shipbuilders, if given a policy and direction by the Government, can meet our needs.



A "CONVERSATION PIECE" IN THE DINING-SALOON OF R.M.S. "ORCADES"

This interesting piece of decoration is a bas-relief by Mr Ceri Richards. It symbolizes Neptune watching over the course of the ship. There is also an astrolabe of silver metal, sun and moon, and other decorations, built up on several planes Whatever may be thought of the design, it certainly gives the diners something to talk about—hence the title "Conversation Piece."

By courtesy of the Orient Line

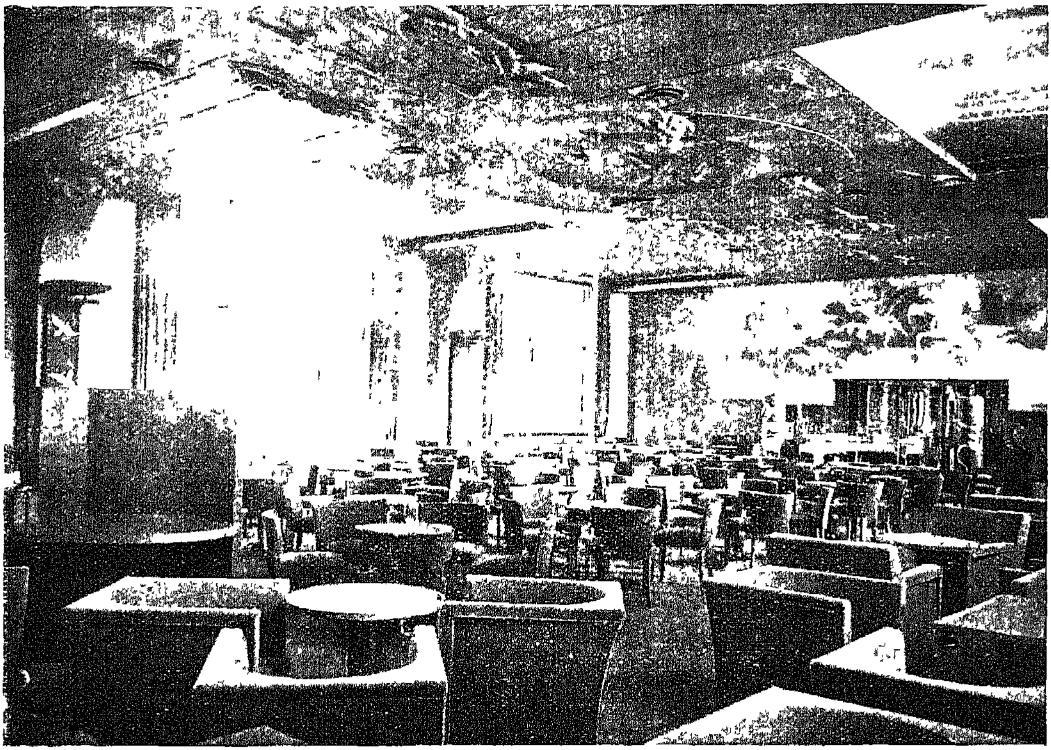


THE FIRST-CLASS LOUNGE IN R.M.S. "ORION"

This is an impressive and restful room, with milk-white columns, cherry-mahogany walls, and hand-made rugs. It was designed by Brian O'Rorke, M.A., F.R.I.B.A.

By courtesy of the Orient Line

All the honours of progress in mechanical propulsion at sea, with the solitary exception of the turbine, all the scientific installations for dealing with perishable cargoes, all the specialized equipment for the speedy loading and discharge, all the constructional changes—the horizontal-rib framing of the Isherwood system is a major revolutionary change—indeed, everything appertaining to efficiency in the transport of cargo, living or dead, belongs to the Merchant Service. Britain taught the world how to build the power-driven ship, and at the outbreak of the Second World War nearly half of the shipping under construction in the world was being undertaken by British shipbuilders. Now that the war is over it is imperative to replace passenger and cargo liners and to scrap ruthlessly all obsolete shipping. The late President Roosevelt already has given a lead to the Americans and told Admiral Emory Land to prepare "a bold and daring plan" to improve and maintain their merchant marine. We should not let the merchant fleet become static; there is great need for modern, comfortable, low-travel-cost passenger ships



THE "GRAND HALL," OR LOUNGE, OF THE "NIEUW AMSTERDAM"

This ship, the finest and largest ever built in the Netherlands, is also remarkable for its internal decoration This room was designed by the Dutch artist *Hendrik T Wijdeveld, one of the sixteen architects entrusted with the task of decorating this pride of the Holland-America Line*

Photo Van Ojen and Stokvis

Though attention has been devoted to the North Atlantic passenger liners competing for the Blue Riband, it is not because of the spectacular appeal but rather because these vessels sail over the most fiercely competitive routes on the bleakest and stormiest of the oceans and have behind them the largest resources of capital. In 1937 the total traffic under the North Atlantic Conference Agreements, west and east, amounted to 658,771 souls. It is on transatlantic crossing that ships are put to the hardest tests both of speed and endurance, and vessels on this express passenger service represent the finest achievements in the ocean liner.

They have served their homeland magnificently through the war. Stripped of their luxury appointments, camouflaged in their grey paint, gunned for their self-protection, their speed their best defence against submarines, they have been busy 'trooping.' Cunard liners alone have transported nearly three million troops over all routes, of which roughly two-thirds were carried in the *Queen Mary* and *Queen Elizabeth*. Britain has emerged from the war in Europe with the largest and most modern passenger liners afloat. America has either lost or so completely converted her ships that they must be scrapped, and Germany and Italy will probably have to surrender what is left of their passenger fleets. France is without her *Normandie*. Britain's transatlantic services will open peace-time schedules that 'cannot be challenged.' Cannot be challenged? The future is full of challenge and new ships, different ships, low-travel-cost ships, smooth, beautiful, and fast, will come to assure passengers on the grey Atlantic that they will be as comfortable and safe aboard ship as at home.

SOME TRANSATLANTIC RECORDS

Year	*Steamship*	*Gross Tons*	*Owners*	*Passage*	*Sea Miles*	*Time in*			*Average Speed in Knots*
						d.	*hr*	*mn*	
1900	*Deutschland*	16.502	HAPAG	E to W	3,073	5	20	20	21·95
1901	*Deutschland*			W to E	2,970	5	11	10	22·63
1903	*Kaiser Wilhelm II*	19,361	Norddeutscher Lloyd	E to W	3,052	5	15	10	22·60
1903	*Kaiser Wilhelm II*			W to E	2.971	5	10	42	22·73
1909	*Lusitania*	30.396	Cunard	E to W	2,784	4	11	42	25.85
1911	*Lusitania*			W to E	2.932	4	18	40	25·57
1909	*Mauretania*	30,700		E to W	2.784	4	10	51	26·06
1924	*Mauretania*			W to E	3,198	5	1	49	26·25
1929	*Mauretania*			E to W	3,162	4	21	44	26·9
1929	*Mauretania*			W to E	3,098	4	17	50	27·22
1929	*Bremen*	51,655	Norddeutscher Lloyd	E to W	—	4	17	6	27·91
1930	*Europa*	49.746		E to W	3.157	4	16	15	28·51
1933	*Rex*	51,062	Italian Lines	E to W	3,181	4	13	58	28·92
1935	*Normandie*	83,400	C G T	E to W	—	4	3	14	29·53
1935	*Normandie*			W to E	—	4	3	25	30·34
1937	*Normandie*			W to E	—	3	22	7	31·20
1937	*Queen Mary*	81,200	Cunard	E to W	—	3	23	2	30·58
1938	*Queen Mary*			W to E	2.938	3	20	42	31·69

CHAPTER XIII

EASTERN, AUSTRALIAN, CAPE, AND SOUTH AMERICAN TRADES

(1850 TO THE PRESENT DAY)

Some Pioneer Services—The Conquest of the Power-ship—Design for the Function—Food-carriers—Passenger Ships—The Royal Mail—Pioneers of Refrigeration and Propulsion—The Characteristic Beauty of the Liners—African Development—Deep-sea Tramps.

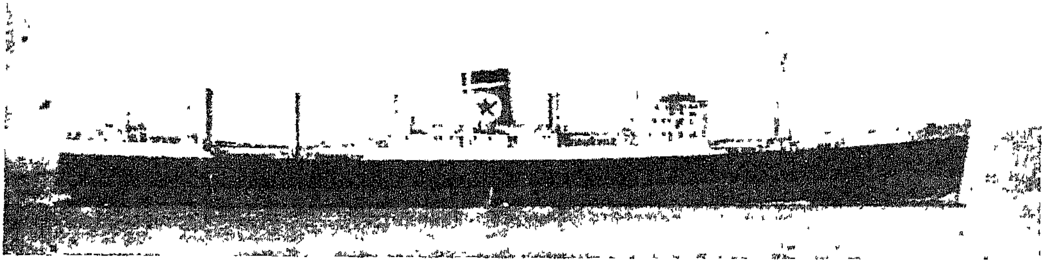
> Do you know the pile-built village where the sago-dealers trade—
> Do you know the reek of fish and wet bamboo?
> Do you know the steaming stillness of the orchid-scented glade
> When the blazoned, bird-winged butterflies flap through?
>
> RUDYARD KIPLING, *The Feet of the Young Men*

WHILE the Blue Riband made its spectacular and disproportionate appeal by reason of its publicity, there is danger of over-emphasizing its importance to shipping and man as a whole. Shipping is manifold, sailing over all routes and in all directions. Normal peace-time merchant shipping required for the successful operation of all services includes a very large and varied number of types of ships, each suited to its own particular purpose, and they range from the mammoth liner to the small coaster, not forgetting such craft as trawlers, salvage vessels, and tugs. A far-flung Empire, a big industrial population dependent on imported food and raw materials, and a Europe hungry for the products of other continents need ships to bring the things by which they live.

Pioneer Services

The East has always cast its spell over the West and the competition for its trade reaches back through the centuries. What a romance and what a history lives in the annals of the ships and men who have sailed beyond Suez—to India, the Spice Islands, and far Cathay! The old East Indiamen, the sturdy Blackwallers, the China clippers, ghosting from Foochow to London, and then the dirty little paddle-steamers, with their pipe-stems belching smoke, invaded these distant seas. Those first P. and O. pioneers who plugged their way into the Mediterranean, transhipped their goods over the Isthmus, and picked them up for Bombay made history. No difficulties of bunkering daunted them, and no ridicule checked their progress. With the opening of De Lesseps' Suez Canal the sailers were driven to the Antipodes. The Hooghli, that once was thronged with windships loading and discharging at Calcutta, was now finding anchorage for the steamers fluttering their national flags—German, French, Italian, Japanese, Swedish, and the Red Ensign of Britain. Not all at once. Slowly and with growing confidence as their engines improved; at first they were coming round the Cape. Some joined in the gold-rush traffic to Australia in the fifties. But twenty-five years from the pioneering first ocean-steamships they were firmly established, maintaining regular services, and the names of their owners have become honoured names in the shipping world. P. and O. British India, Clan, Henderson, Hall and City, Anchor—these are but a few of the British companies. By 1830 the Australian wool export loaded hundreds of ships for the English cloth-manufacture, which was becoming fully mechanized. The opening of the Ballarat goldfield in 1851 quintupled the population of Victoria in five years. Australian and New Zealand gold and grasslands invited emigration, and shipping was quick to respond.

Meanwhile the Shaw, Savill, and Albion—now the Shaw Savill Line—whose flying beauties on the New Zealand route, and the Aberdeen Lines, whose record-breaking wool-clippers traded with Australian ports, realizing that steam-power had arrived, were enterprising enough to change over without delay. Other steamships followed in their wake. Yet how cheaply these old sailers carried their passengers and cargo, and how ready they were to seize the opportunities of trade. Shaw, Savill, and Albion in the seventies brought mutton refrigerated on board, because there were no such facilities ashore, from New Zealand to London for $2\frac{1}{4}$*d.* a pound. *The Times* of the day recorded it with astonishment as a "prodigious fact." The immigrant's fare from London to Otago was only £13 10*s.* 0*d.*, and the fare from Glasgow £12. It was the invention of the cream-separator that added to the meat and wool exports the rich market in dairy produce, and New Zealand butter was sold more cheaply than our own farm-produce.



T.S.M.V. "AUSTRALIA STAR" (11,122 TONS)

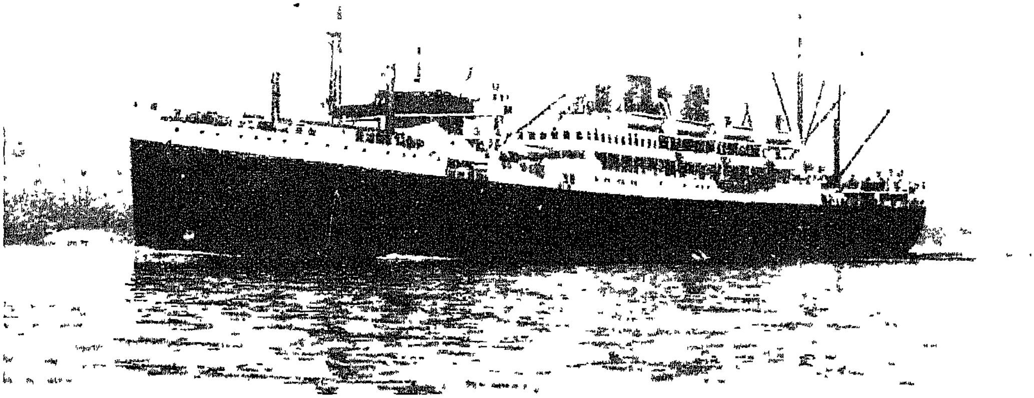
This vessel is a refrigerated ship and was built by Harland and Wolff for the Blue Star Line for their Southern Dominions trade. She has accommodation for twelve passengers.

By courtesy of the Blue Star Line

Transatlantic liners, notably those of the White Star, were commissioned for these Australasian services, and, sailing outwards via Teneriffe and Capetown, where they bunkered, they returned via the Horn, Monte Video, and Rio de Janeiro. This not only afforded opportunities for coaling but opened up new channels of business. The South American Republics provided vast natural areas of country rich in resources, and much British capital had been invested there to develop them and their internal communications. Railways now brought the raw materials and the food-supplies from the hinterland to the coast for the steamers to bring to the European markets.

Food-ships

It soon became obvious that steamships must be specially designed for the particular service upon which they were engaged. Beef was less successfully transported than mutton because refrigeration did not arrest putrefaction, and beef was available in plenty in the Argentine. The cattle-steamers—of their hardships and cruelties we have graphic descriptions in the writings of O'Neill, Masefield, and W. H. Davies, who all served on them—were displaced by the scientific development of refrigerating processes known as chilling. Great attention was given to the physical characteristic of perishable cargoes, and by means of the technique of air-conditioning, which made it possible to control with exactness the temperature and the carbon-monoxide content, these valuable foodstuffs can now be carried thousands of miles and delivered in prime condition. Meat-carriers have been at sea for over forty years, but apart from the Caribbean banana trade, particularly developed by the Elders and Fyffes Line, there were no fruit-carriers until after 1918. The Houston Line specialized in the meat trade from the river Plate. The Blue Star Line is also engaged in this trade.



M V "Highland Patriot" (14.157 Tons)

The Highland Class vessels of the Royal Mail Lines were built by Harland and Wolff for the intermediate service between London and South America, carrying passengers and refrigerated cargo. This ship was lost through enemy action in 1940

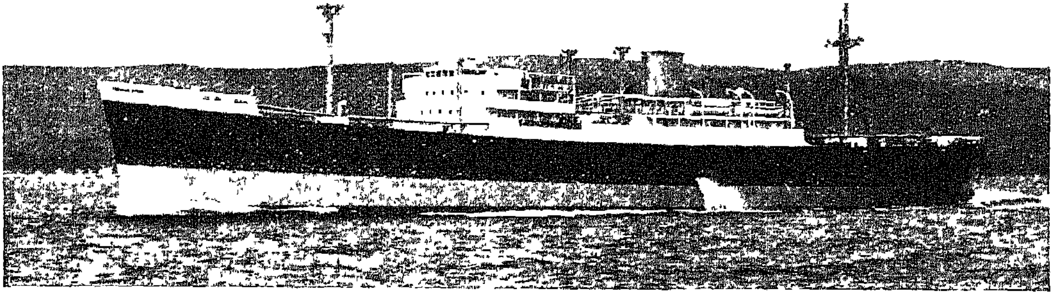
By courtesy of the Royal Mail Lines

These ships engaged on this trade were all food-carriers, and the development of this particular type of vessel has gone on apace. It was a market which hungry Europe was anxious to buy in, and the competition for the carriage of these valuable yet perishable cargoes was keen. Not ordinary ships could successfully undertake this work. Food-ships are veritable boxes of machinery, for apart from the propelling machinery there is the refrigerating and air-conditioning apparatus and a considerable amount of auxiliary machinery for the ship's services and deck machinery for handling the ship's cargo. Such ships are costly to build and maintain. They are fast ships, averaging 16 knots. This type of highly specialized vessel for service on the food trades in all the four corners of the world was mainly evolved by Harland and Wolff. Many famous shipping companies now own refrigerated ships. P. and O., Shaw Savill, Elder Dempster, Ellerman, Anchor, Donaldson, Bibby, and New Zealand Line sailing via Panama—all maintain services to the East and Australasia; the Port Line, the Houlder Line, the Blue Funnel Line of fine Holt vessels, the Union Castle, the Blue Star, and the Royal Mail serve over the African and South American routes. The list is by no means exhaustive, and only includes some of the representative British companies. All have their histories, all have weathered the storms of tide and circumstance, but more than passing reference is due to the Royal Mail, which celebrated its centenary in 1939.

The Royal Mail

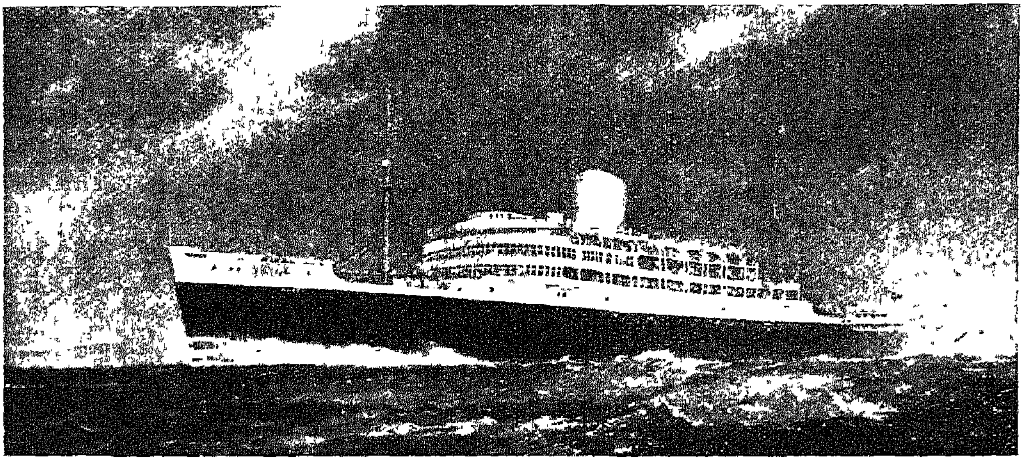
Its history is a remarkable record of a great shipping undertaking and of the development of ships and engines from the paddle-steamers to the large passenger-liners, *Asturias* and *Alcantara*, and their latest, *Andes*, which has yet to make her first commercial voyage. The Royal Mail Company were among the pioneers of the Diesel-engined vessels with their "Loch" ships, built by Harland and Wolff for the fruit trade in particular. The opening of the Panama Canal in 1914 had brought the west coast of North America many thousands of miles nearer Europe. The Royal Mail, whose Shire line had operated on the Pacific, now opened in 1920 their service through the canal to San Francisco, Seattle, Victoria, and Vancouver, among other ports, and the "Loch" ships made their transatlantic voyages to the West Indies, the ports of the Spanish Main, and the ports on the Pacific coast of North America. It is fitting that the company which pioneered the *Great Western* in 1847—having acquired her from her original owners—should be so closely identified with the latest propulsive engine, the Diesel, but it must be added that both the *Asturias* and *Alcantara* were reconverted in 1934 and 1935 into geared steam-turbine-driven ships to gain greater speed. The Royal Mail earned a great reputation too for first-class cruising, and the *Atlantis* was the largest vessel in the world solely devoted to pleasure cruising. When James MacQueen laid the foundations of the Royal Mail with his fleet of wooden paddle-steamers a century ago he opened a great career of a great company, whose name is honoured wherever the Red Ensign is carried, a line whose passenger ships and freighters represent the best of their time, a line that particularly contributed to the development of our West Indian possessions, a line that had its triumphs and its calamities, but which nevertheless spans the history of the power-ship with a fine record of achievement.

Ships on the China and Indian services have no emigrant trade, and their passenger list is not comparable with those on the American or colonial routes. Mostly Government officials or civil servants, engineers, planters, and their families, they require high standards of personal comfort. So too with vessels employed on the South and Central American services where there are bigger passenger loads and the need for all the amenities. Ships sailing to Australia and New Zealand cover all classes, and tourist, one-class ships are also run, all provided with every means for making the trip a pleasure to remember and not an ordeal to forget. Ships using the Suez Canal or the Panama are limited in size and draught by the capacity of the canals to take them. Ships sailing in tropical waters are not enclosed steel shells like those on the cold Atlantic but provide for life and amusement on the decks, which are naturally more in use. The newest Royal Mail liner, *Andes*, completed by Harland and Wolff's, in whose yards she was built and engined just before the outbreak of war in 1939, gives an illustration of the quality of these ships. Of 25,689 tons gross, intended for the Royal Mail Line's service to Brazil, Uruguay, and the Argentine, she offers comfort and luxury in her passenger accommodation. Lovely in shape, both of hull and superstructure, with a raked, rounded stem and cruiser stern, once she can be restored to the company's colours she will ornament the sea. Theatre and ball-room are included in her public rooms, observation lounge, open-air swimming-pool, spacious and lofty promenades, and wide expansive sports' decks are only some of her features. She was requisitioned in November 1939, and her voyages have been world-wide, embracing South Africa, the Mediterranean, Hong Kong, Australia, New Zealand, and the Pacific. Up to the end of the war she travelled some 530,000 nautical miles and carried approximately 350,000 troops.



One of the Loch Class Refrigerated Motor-driven Ships (9400 Tons)
Built by Harland and Wolff for the fruit trade between England and California. These vessels carry twelve passengers
By courtesy of the Royal Mail Lines

How lovely these express passenger liners are sailing to the East, the Cape, and South America! The Pacific Steam Navigation Company's fine motor-ship *Reina del Pacifico* lives up to her name on the South American passenger trade. The P. and O., proud of their history, are the pride of the Far Eastern routes. The Castle liners have an enviable reputation for their grace of form and attractive presence. The Orient liners have won praise from all the discerning for their taste in modern decorative schemes. The Royal Mail liners are unexcelled in comfort and appearance.

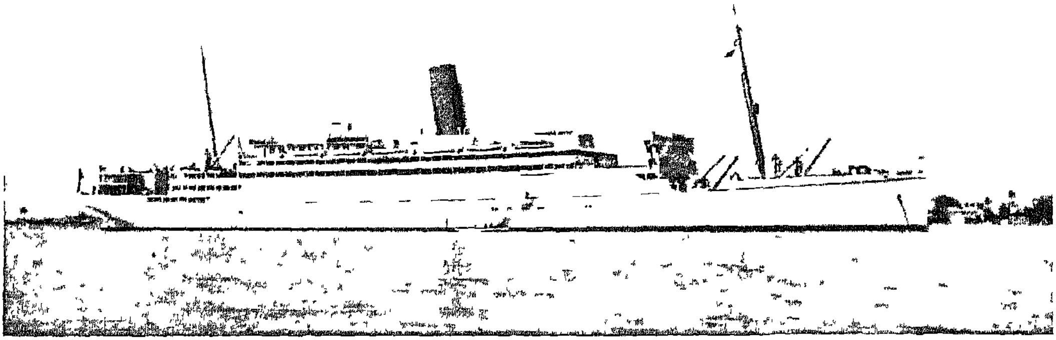


T.S. "Andes" (25,689 Tons)

This Royal Mail luxury liner was built by Harland and Wolff specially for the express service between England and South America. She had only just been completed when war broke out in September 1939.

By courtesy of the Royal Mail Lines

Ships such as these need fear no comparisons with the leviathans on the Atlantic North American services. They have pioneered the turbo-electric and the motor-ship. They have pioneered and developed the science of refrigeration so that to-day their cargoes are the most precious on the ocean. The food-ships bring the cattle from the pampas of South America, the sheep from the ranches of Australia and New Zealand, the butter, eggs, and milk from the distant farmlands, the fruits of the earth—citrus, pomegranate, melon, grape, banana, fig, and pineapple—the whole dessert-bowl of the peace-time table for our health and delight. And it is these passenger-cargo express liners of moderate tonnage that ply over the Eastern, Australasian, Cape, and South American routes which are more likely to provide the pattern of post-war ships than the *Queen Elizabeth* or *Queen Mary* or other giant holders of the Blue Riband of the North Atlantic. It was the increasing industrialization of Europe that led to an increasing interest in tropical areas which could be developed as sources of raw materials and receivers of manufactures. Africa became the scene of international competition. France was chiefly concerned with the north and north-west from the Mediterranean to the Equator; Italy with North-east Africa. Germany, under Bismarck, needing raw materials and tropical markets, annexed substantial dependencies. The Congo, with its 'red rubber' atrocities, was horribly misgoverned by Leopold II of Belgium Britain shared in the partition, East, West, and South Africa eventually falling into the orbit of her Empire In 1885–86 the "savage South Africa" which inspired Rider Haggard yielded to the industrialization following the discovery of the great gold-field of the Witwatersrand, in the Transvaal. Within ten years the immigrant white population, the Uitlanders, equalled in numbers the Boer population, and the result of this intrusion was the South African War The Peace of Vereeniging, in 1902, acknowledged British sovereignty Military conquest and political settlement by Europeans, with few exceptions, were preludes to social services, organized agriculture, and profitable exports providing raw materials for the world's industries and raising the standard of living To transport these goods there was international shipping rivalry Palm oil, rubber, and ivory from the Gold Coast, gold, precious stones, wine, fruit, wheat from the Cape ports, coffee, tobacco, cotton from East Africa; and in this trade the British merchantmen claimed the major share And among her great pioneers and builders not Rhodes but Livingstone and Lugard are most to be honoured in the annals of African colonization



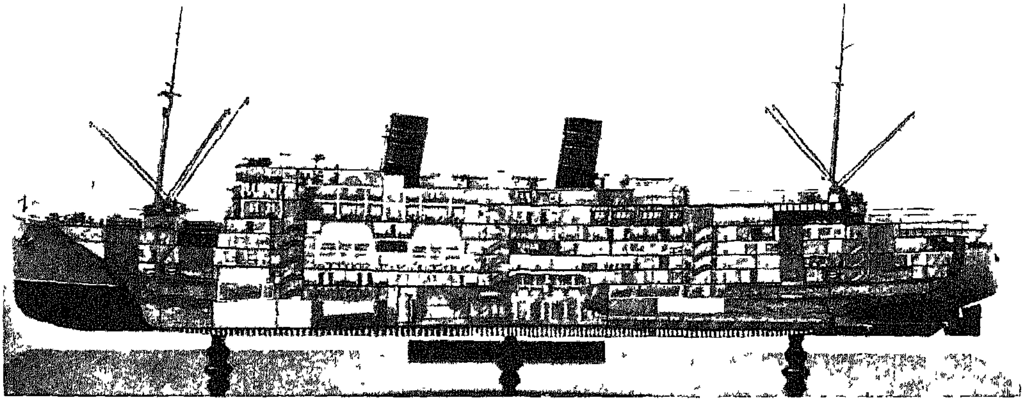
S S "ATLANTIS" (15,100 TONS)

This Royal Mail liner formerly named the *Andes* was built by Harland and Wolff in 1915 In 1933 she was refitted for pleasure cruising and subsequently devoted exclusively to that purpose During the war of 1939–45 she was employed as a hospital ship

By courtesy of the Royal Mail Lines

Deep-sea Tramps

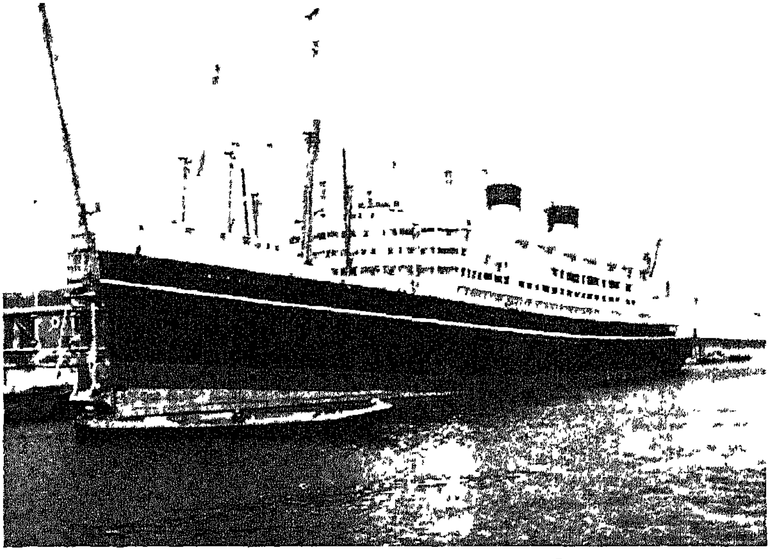
It is not of the well-designed, well-equipped, and well-appointed vessels, however, that we think in connexion with these trades, for these are, in the main, well run and owned by responsible liner companies with a conscience It is rather of those other fleets of deep-seagoing ships, many of them privately owned, that share the burden of the traffic over these routes, ships sailing from the Tyne and North-eastern Coast ports



A SECTIONAL MODEL OF M.V. BERMUDA

This model was built to the order of Workman Clark and Co., Ltd., to show the ship's interior arrangement. M.V. *Bermuda* was engaged in the New York, Bermuda and West Indies service.

By courtesy of Bassett-Lowke Ltd.

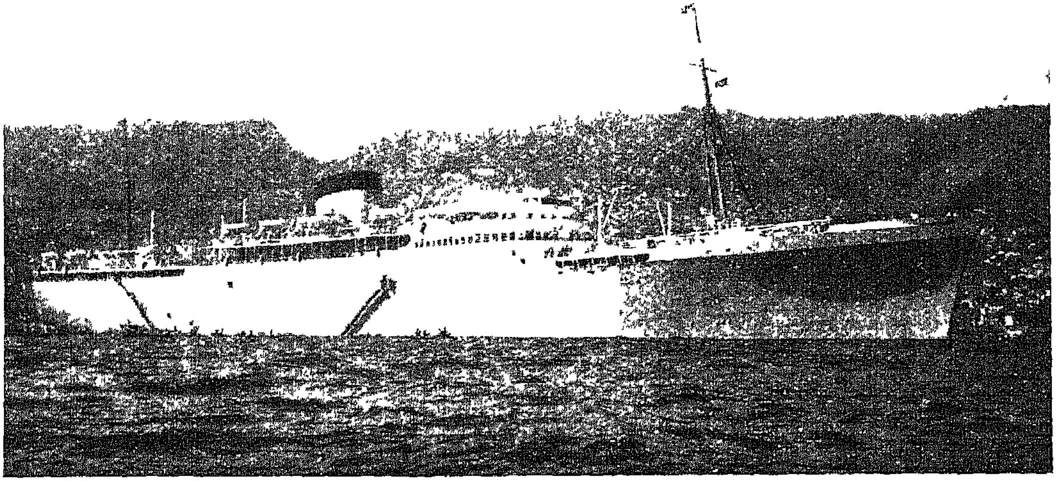


M.V. DOMINION MONARCH (27,000 TONS)

This quadruple screwed liner is the largest that has been built on the Tyne since the first *Mauretania* in 1907. She was built in 1939, by Swan, Hunter, and Wigham Richardson, for Shaw, Savill, and Albion Company, Ltd., and is now engaged on the new service to New Zealand via Capetown and Durban.

Photo Bassett Lowke

and from Cardiff and the South Wales ports, ships sailing to the Plate with coals out and grain home for cargo, ships that hog east, south, and west, securing their charters in a fiercely competitive market not by reason of their high efficiency, the truest form of cheapness, but by economies exacted by saving in capital outlay, maintenance, and wages. These are the deep-sea tramps that in many cases continue oblivious to the progress of shipbuilding and engineering, and indifferent to changed conceptions of seamen's welfare, stagnating on the high seas with their steam reciprocators and 'Scotch' boilers doing eight to ten knots. Freedom for these ships means only the freedom to ignore technical innovation and the sweep forward in methods of propulsion and design, freedom to continue condemning their crews to use outworn methods and exist under miserable conditions. Enterprise means cut-throat economies, even in essential maintenance, and the tenacity of keeping ships in commission long after they are due for the breakers.

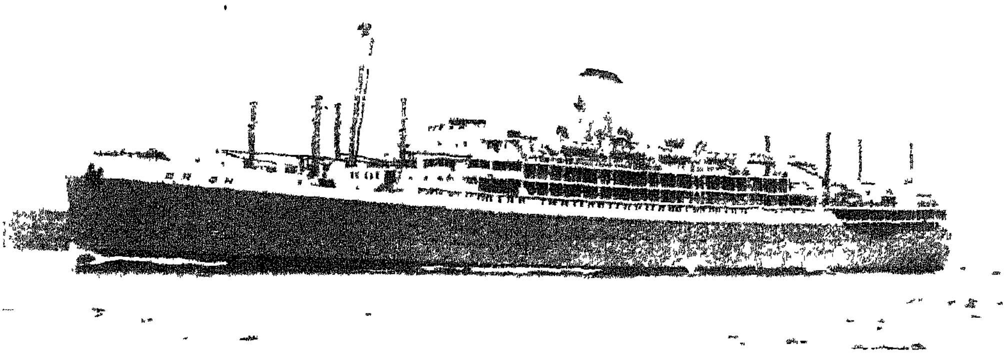


R M M V "Capetown Castle" (26,830 Tons)

Ships of this class have lavender-grey hulls with the upper work in white, and funnels red and black. Among them are some of the most attractive ships on the seas. This vessel was built by Harland and Wolff for the Union Castle Line, for express service between England and South Africa

By courtesy of the Union Castle Steamship Company, Ltd

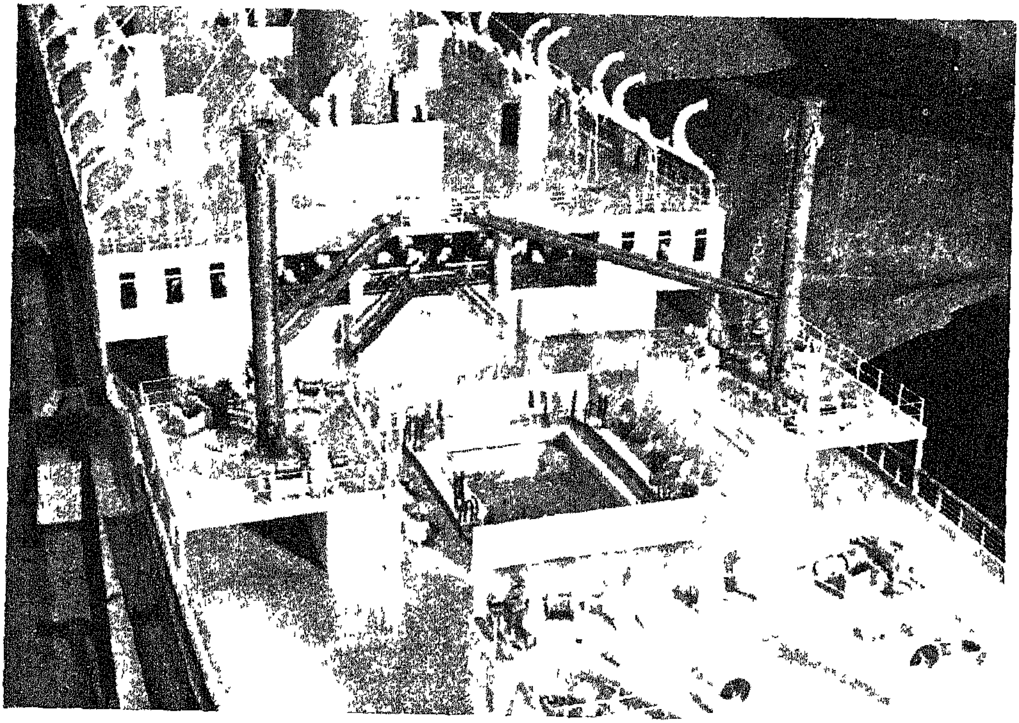
These were the ships that suffered such frightful casualties during the war, and, while it would be untrue to suggest that all shipping losses due to enemy action were those of obsolescent vessels, it is certainly true to say that the slow deep-sea trampers had not the reserves of speed which were the best defence against submarine attack. The figures in this branch of the industry of shipping losses speak for themselves. Some 75 per cent. of the deep-sea tramps operated by British shipowners, a total of 571, were sunk by enemy action during the war, and during one period in 1942 we lost practically



T.S. "Orion," [illegible]4,000 Tons

This ship was built by Vickers-Armstrongs, Barrow, and launched in [illegible]. She is the first of the single-masted [illegible] Orient ships, and is being used in the mail, passenger and cargo service between London and Australia.

By courtesy of the Orient Steam Navigation Co., Ltd.



A Portion of a Model of M.V. "Dominion Monarch," showing the Veranda Café, Bathing-pool and Gear on the After-deck

By courtesy of Bassett-Lowke, Ltd.

one ship a day. It is not a comfortable reflection that many of these old, slow ships, ill-found, ill-equipped, and ill-fitted to face the dangers of the submarine-infested waters, sailed with the shadow of doom on them.

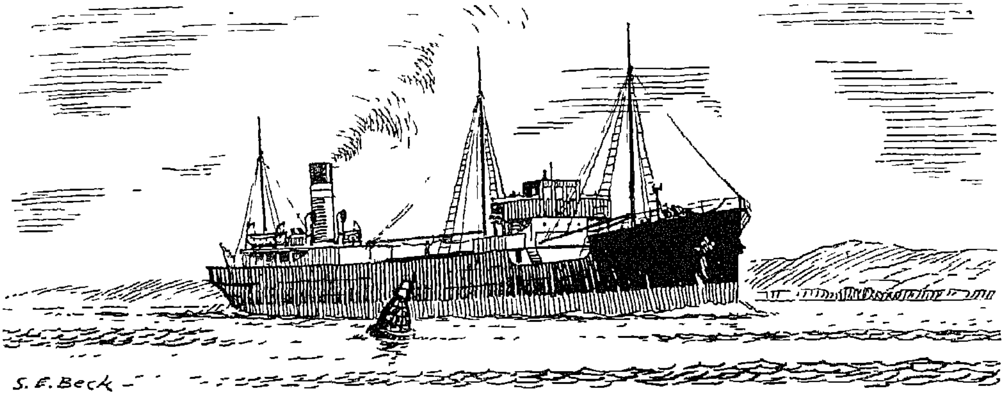
Listen to the men who saw their fellows go down in the icy, dark seas, and their bitterness is all the deeper when they remember the long odds against them. Their stories often do no credit to their ships. In such circumstances memory is apt to reach back to the pre-war days with an accusing voice. Their deal has indeed been a hard one. They recall that when loaded with grain they reduced speed to a crawl on the Atlantic, gaining time at the bidding of remote authority in city offices gambling for a rise in prices. They tell of engineers to curry favour with their owners cutting coal-consumption to such a bare minimum that stokers confessed to stealing cargo to eke out the trip. They tell of shipmasters who extorted profiteering prices for tobacco and cigarettes. They remember building baulks of timber and cement into a protective wall to prevent the flooding of their quarters in heavy weather. They speak of the exploitation of willing cadets. They tell of the door to the crew's accommodation facing the hot blasts from the engine-room in ships which sail in the tropics. They remember the parsimonious issues of stores, the 'wangling' and the mutual dishonesties—all bred in an atmosphere vitiated by the spirit of meanness, which ran down from the owners to the deck-hands. Not all their complaints are unjustified. It is the sailor's right no less than that of other men to grumble, but the nature of these complaints again forces the question whether the private-profit motive can ever be harmonized with the general welfare. No wonder that the seafarers' organizations are pressing for much-needed reforms while the memory of their services and hardships is still fresh in the public mind.

With three-quarters of our deep-sea tramp steamers lost, and the remainder in large arrears of maintenance, the problem facing owners is the restoration of their fleets to a full state of competitive efficiency. With costs of renewal more than doubled, their task is formidable. The disposal of surplus United States and Government-owned ships may help towards their reconstitution, though preferential treatment is to be given to American nationals in the disposal of their 50,000,000 tons of surplus merchant shipping built during the war of 1939. Foreigners are to be excluded from charter privileges and only permitted to buy vessels not wanted for the creation of a strong post-war American merchant marine. But do our shipowners want them—good ships though they be? A quarter of their life is already done, and they would be expensive to refit and run. Only as an emergency expedient to meet the shortage of our shipping can they serve. It was estimated by Sir Philip Haldin, chairman of the deep-sea tramp section of the Chamber of Shipping of the United Kingdom, that the number of tramp ships in private ownership in Britain at the end of the war was about four hundred short of the 1939 figure. This is then the opportunity to replace them with modern vessels, with modern equipment, satisfying modern standards of comfort as well as efficiency. The State should exercise a watching brief to see that it is done, and further, by explorations in the international sphere, secure the means to ensure their full employment. Without the right ships we cannot hope to recapture the lost carrying trade so essential to the country's recovery, and without the trade we can never dispel the pathological dread of unemployment and extend the social security measures which are the men's right and the State's responsibility.

Our economic recovery depends essentially on the revival of our export trade for which shipping is vital. One of the worst blows we suffered during the Second World War was the decimation of our merchant fleets by aircraft, submarines, and mines. Our pre-war tonnage of ocean-going ships was approximately 22,100,000 gross, registered tons, and our losses sustained during the fateful six years were approximately 18,000,000 tons gross, registered. British and Canadian shipyards, purchases from other maritime nations, and prize ships of war made good about 60 per cent. of our losses, but still the end of hostilities left us with only about three-quarters of our pre-war fleet. On the other hand, the mass-production methods pioneered by the Kaiser organization of building Liberty ships have quadrupled the size of the American mercantile fleet. The great majority of new ships now projected or building are intended for the Indian, Far Eastern, and Pacific trades, where British losses were most severe. Realities are stubborn "chiels that winna ding," and we may well ask if we are in tune with them. In a war-stricken world with transport systems paralysed and food distribution inequitable in consequence, with the fantastic contrast and anomaly of surplus and starvation accentuated by shipping shortages, it is imperative both in our own interests and those of others that the rebuilding of a strong and virile Merchant Navy should have a first priority. Apart from the invisible assets our ships earn and which we need so badly, apart from the rôle they would play in our national recovery, they would help materially the recovery of our impoverished world, for bitter experience has proved that prosperity is indivisible.

The Badge of the British Merchant Navy

grain mills 'and bonded warehouses; Parkgate, on the Dee, and Chester, that once rivalled Liverpool; and the vanished port of Gatehouse-of-Fleet, on the Solway, with its tannery and soap factory, cotton mills, and shipyard, that passed away with the coal- and steam-age which moved its industries to Glasgow. It is a fascinating experience to wander along their waterfronts and think of the times when they could boast a full dock of windships. There is still the tang of the sea, and that pungent mixture of smells of rotting wood and tar and seaweed. You find these haunts in coastal backwaters all round our coasts, by Chichester, along the reach of the north shore of the Isle of Wight, by Appelcombe in Devon, and Fowey in Cornwall, round the Scottish coasts too along the Solway or north on the Moray Firth. The old marine stores are closed or have become the village shop, where you can still buy oil and candles, lamps and twine. Scars of peeling paint tell of neglect, yet the little tavern welcomes with its firelight and rococo furnishings, crimson plush, tawdry, gold carven mirrors. But why lament? Romance puts a gloss on a picture, which, faithfully drawn, is forbidding. The clean, speedy, safe, well-conditioned, motor-driven coasters of to-day, manned by men more skilled and better educated and conducted than their forefathers are surely better than the ships and men on this trade a century and a half ago.

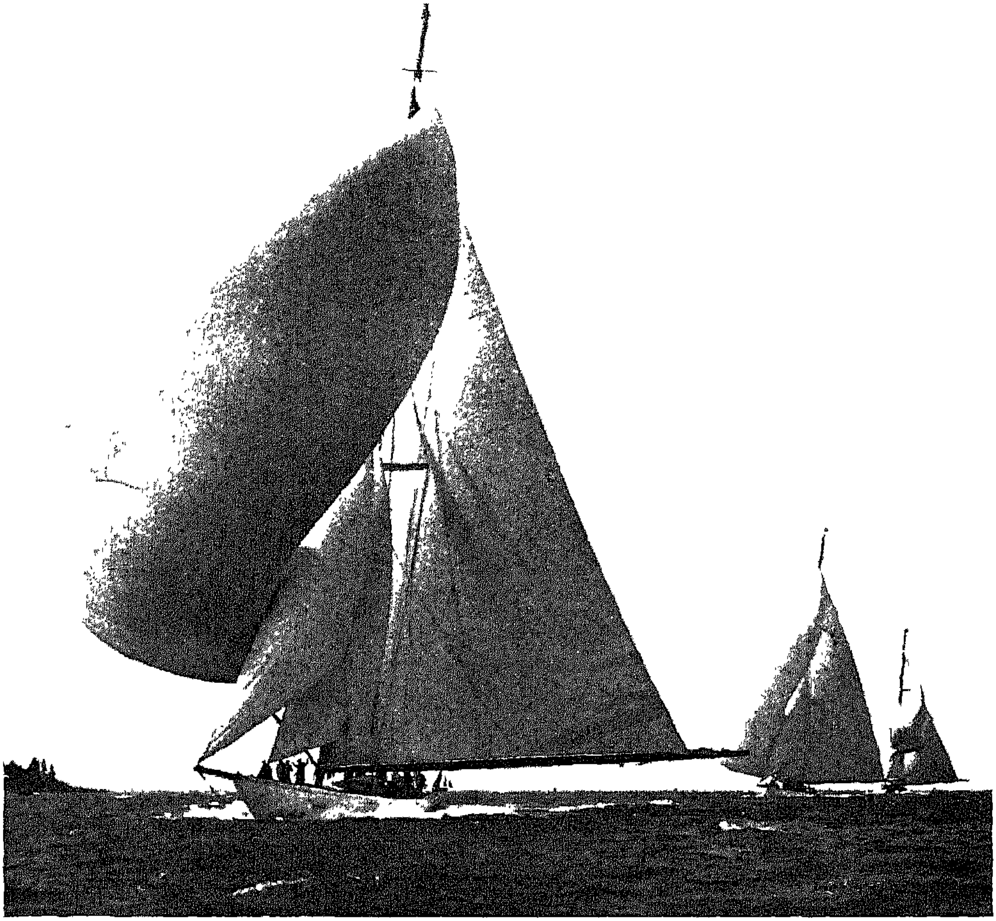


A EUROPEAN CARGO COASTER (STEAM)

This vessel is typical of the coasting trader, with the machinery aft and length about 190 feet Ships of this type are built to face the weather.

Coastal Services

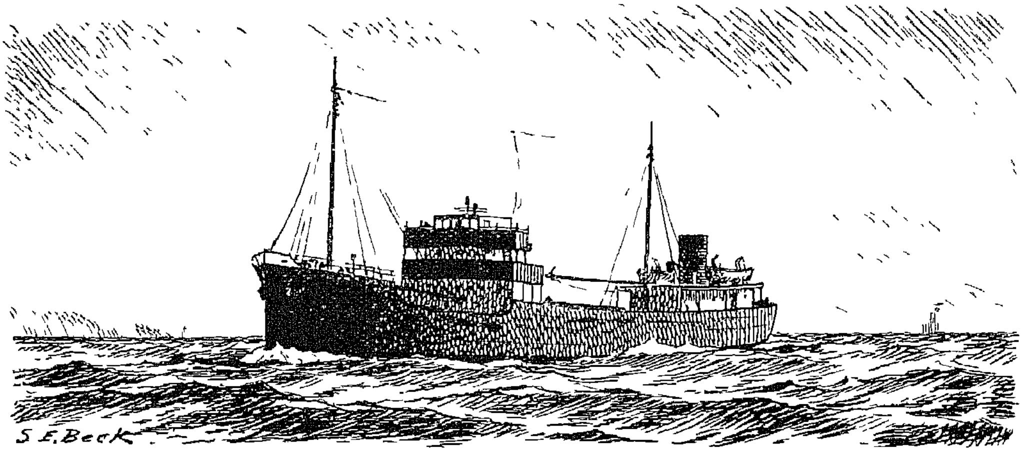
The coastal services are now highly organized, and the coastal liner, which works to a time-tabled service, is an integral part of our transport system. For many classes of goods it is superior to other forms, and since the sea is a natural highway and ours is an island with its population centres near the coast it provides the cheapest form of transport. Coastal vessels calling at the smaller ports must be designed so that they do not draw too much draught, and the service has now been so well organized that various



Cowes Regatta
Photo Beken and Son, Cowes

standard types suitable for their particular trades and ports of call have been put into operation. Shore-gear too has had to be provided to cope with the cargoes, for rapid loading and discharging are essential when ships run to schedule.

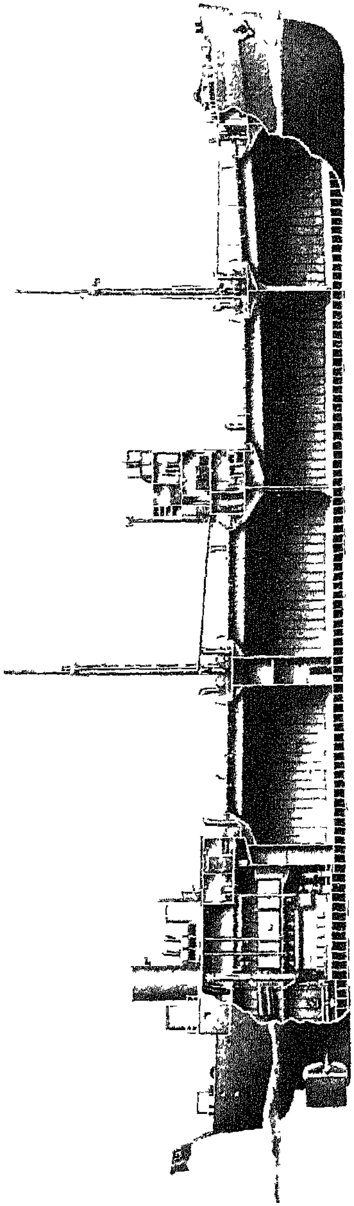
Throughout the war these services were vital. Their flexibility and capacity kept the flow of traffic moving when disruptions occurred through enemy action. These light and shallow-draughted ships, which are not designed for long ocean voyages, are invaluable both to the community and to the internal economy of the country, and the modern motor-ship does much to remove the stigma which these coasters in the past earned. For among the ships at sea the living conditions for their men were among the worst. Indeed, so bad they were that one wondered how much a man must put up with to earn his daily bread. They clung—and still do—to the old reciprocating engine, content to chug along at from six to eight knots. They squeezed their crews into the fo'c'sle under slum conditions. Their hatch-covers of tarpaulin were perilously insufficient to weather heavy flooding seas, and how many foundered, swamped in a gale. Ill paid, dirty, ill found, irregular in their services, the old-time steam-coasters, of which many still are at sea, were no credit. The well-designed, efficient, modern motor-coaster, giving equal attention to the well-being of her crew as she does to the stowage of her cargo, has a vital place in our transport system.



A MOTOR COASTER
This is a useful little ship, able to cross the North Sea in almost any weather, and to dock at small out-of-the-way ports. The average length is 125 feet

Small Shipyards

Straggling round our coasts, up tidal creeks and river estuaries, anywhere that there is a sufficient local supply of timber and water enough to float a craft when it is built, can be found the yards of the little ships. The six years of world war have animated into new life the derelict and forgotten slipways and seen the growth of new yards on sites and in places where hitherto no such industry existed. Particularly is this the case along the Devon and Cornish coasts. These yards present a scene of lively activity, and where once there were only ugly rubbish-dumps now sprawl the timber-sheds and timber stacks of the builders. What a pictorial setting—the slipways dipping into the tidal waters, the boats, in various stages of construction, perched on their stocks, the men busy each with his own business in one united effort. There is the smell of wood and the tang of salt-water, the hiss of electric welders and the rustle of leaves, the clang of hammers and the gentle lapping of the waves. Here are vistas to invite the artist with his notebook, and something too for the thoughtful to contemplate. Here Nature and industry blend into a harmonious scene. A shipyard is a living organization, for these men can watch the efforts of their handiwork and see the ship grow till the day comes when she is launched. It is an occasion for men who have worked together so closely on a small ship. These men were not shipwrights, but carpenters, joiners, mechanics, masons, labourers who had never before shared the work of building a ship. But under the instruction of a trained shipwright they take to it as readily as the townsmen who learn to man the ships. Go round the shops and see the pride of the craftsmanship of those engaged in constructing the vessels' furniture. Look at the timbers, oak and larch, pine and sycamore, and watch the man with the adze gently clipping the baulk of oak. See the riveters with the skill of practice and the masked welders knitting steel to steel.

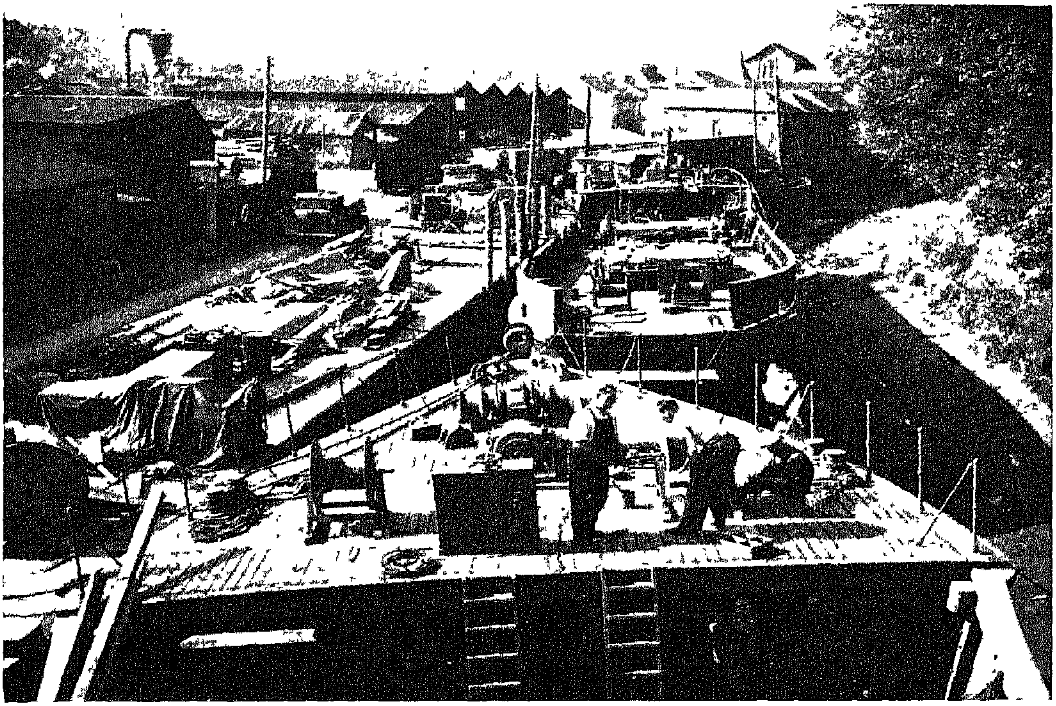


A Section of a Modern Motor Seagoing Collier, M.V. "Idenwood" (2665 Tons)

M.V. "Idenwood" was built by Hall-Russell and Co., Aberdeen, and is driven by British-Polar two-cycle Diesel engines

Reproduced from a drawing by Laurence Dunn by courtesy of the "Burntisland and Hall-Russell Shipyard Journal"

Farther down stream the engines are being fitted and the final touches given before the ship goes on her trials These boats are not leisurely built, and yet the general impression is of smooth unhurried production. In such surroundings and under such conditions the little ships of Britain have been built—minesweepers, anti-submarine vessels, canteen boats, whalers, War Department motor-boats, barges, fishing-vessels, launches, and boom-defence vessels. The timbers were hewn in the morning in the woods that clothe the lonely hills, and by afternoon they are being built into "the wooden walls of England." Except for the deck planking, green or unseasoned wood is used, experience confirming that the practice is justified. Out of the ten shipbuilding yards which Frank Curtis, Ltd., control, stretching at points along the coast from Totnes, South Devon, to Land's End, from the outbreak of war in September 1939 to May 1945 they built and completed for service 1097 craft, and during their peak period turned out forty-five wood barges in a week. These vessels range from 126-foot minesweepers to river and canal firefloat boats, from ships that will sail under their own power to the Far East to 36-foot motor-pinnaces. But what is to become of this revived home industry?

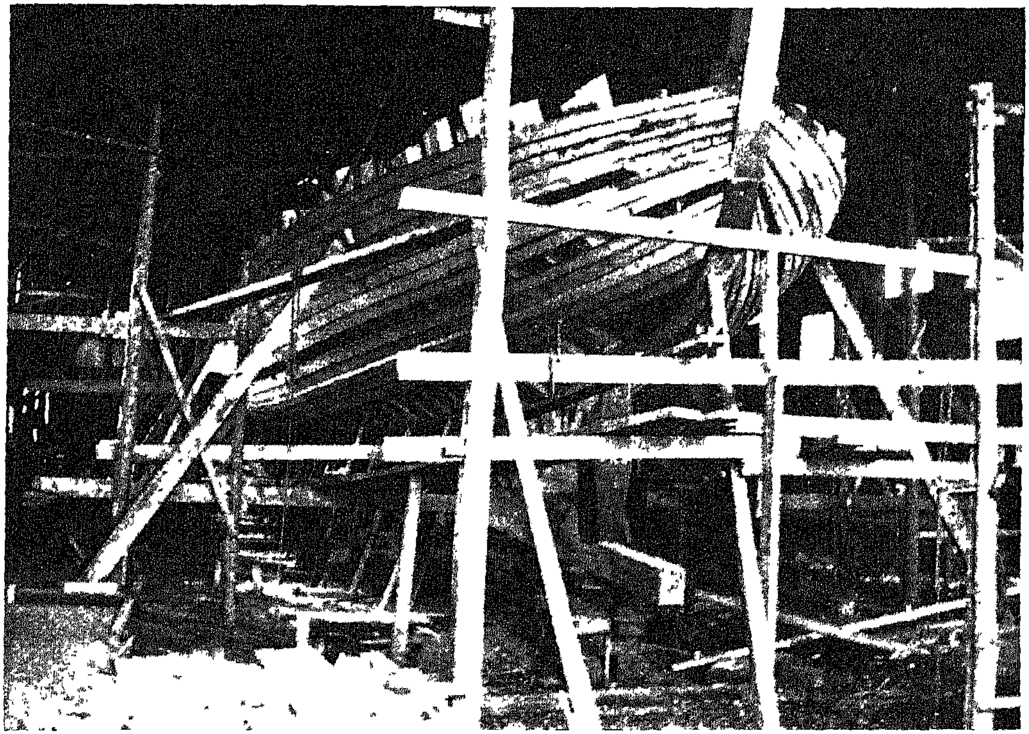


A Shipyard Scene on the River Dart, near Totnes, where ships were built and fitted during the War of 1939–45

Photo Bassett-Lowke

Can it compete in normal times with the Swede and Finnish fishing-boat builders or with the mass-produced, all-steel-assembled ship? Or is there still a place for the local shipbuilder and the local craftsman?

The builders of small craft in their little yards round our coasts, the builders who have filled a war-time gap constructing sturdy naval auxiliaries to serve both in the fleets in the West and in the Far East, the builders of stout, Diesel-engined fishing-craft, which bring in to the ports so essential a part of our food-supplies, say there must always be a place even in this age of steel and mechanization for the wooden ship. The shipwrights on the Kentish, Hampshire, and Devon reaches can look back over the centuries to the distant days when there was always some wooden shipbuilding, when, indeed, the wooden walls of England were built of English oak in their yards. Though they no longer caulk the seams with cattle-hair as in medieval days, the caulking mallet still drives home the strands of oakum, and the adze still hews the timbers as in the days when they built the little ships which scattered the great Spanish Armada. The tradition remains, and many of the old methods remain too, jostling with the modern devices

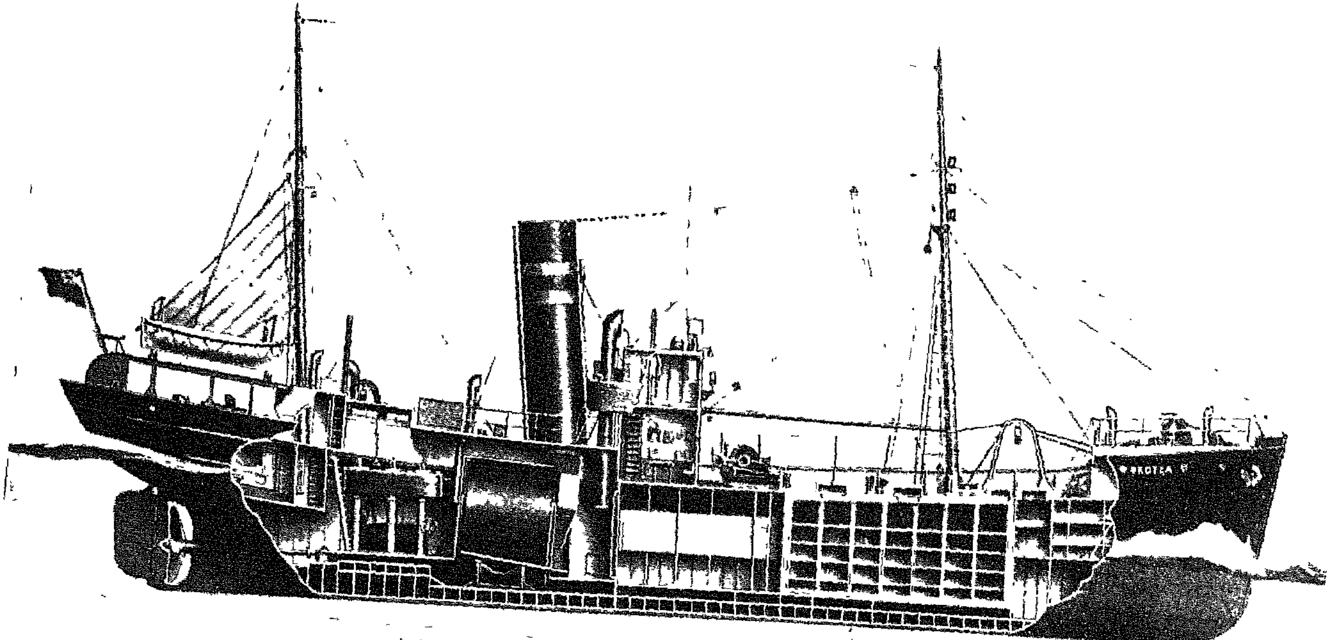


THE BUILDING OF SMALL CRAFT
This scene is in one of the ten shipyards controlled by Messrs Frank Curtis, Ltd
Photo Bassett Lowke

of mechanical circular saws and electrically driven welding plants. It is the same fragrance of newly sawn wood that meets you to-day as from the ancient wych-saw pits. It is the same sound of hammers that has sounded its rhythmic music ever since boats were built. The oak frames have still to be carefully selected from natural crooks in the tree so that the grain will follow the curve as it is sawn to fit. The hull's great planking still has to be cooked in a steam box so that it will give and bend like sprung steel to conform with the wide curves. Must such craftsmanship be elbowed off the shipyards, and must these little builders who have served so well their country's hour of need now go out of business before the march of time? As long as men find joy in a sail rather than a machine, as long as there is room for a local industry and a tradition, there will always surely be some scope for vessels built of timbers grown on our own hillsides. This, at least, can be said. The work, with its traditions, craftsmanship, and community effort, is interesting enough to provide social incentives. Men are happy doing it, and in a modern world of mass-production methods this is something to preserve.

Fishing-vessels

One of the oldest and one of the most essential of our industries, the fishing industry, depends on our ability to build stout craft, and the tradition comes down from those days when all round our coasts the old-world little towns and villages boasted their own fishing-fleets of boats they built and manned. This hardy breed of men, these fisher-folk—Devonmen or Cornishmen, Welshmen, Irishmen or Manxmen, men from the Scottish firths and isles—are a people to themselves. But the villages are quiet now except in the summer-time, when visitors from the big cities and inland towns invade them on holiday and provide a new occupation for the women. No longer are there nets to mend, and fish to gut, dry, and cure in the smoke sheds, and no longer do the fishers' boats get under way for the sea, for the trawlers have come, and the young men have left the sail for the steam. So the villages sleep in the coves below the steep rocks and low cliffs where the gorse and blackthorn grows, and the old men go out to their lobster-pots and talk of the times when the stone jetty and little landing-bay, where the waves suck and break and the seagulls wheel and veer in the sky, were agog with scenes that are no more. Through the long winter days and nights when the sea fogs blanket the coast and the foghorn moos out from the coastguard station on the hill, or when the gales blow, whipping the water into a volley of thunder, they remember the toll the sea has taken of those who win their living on it. Do they not say in Cornwall, when the seagulls come mewing and crying over the villages to which the pilchard boats often failed to return, that the souls of drowned fishermen were to be heard in their flight? Superstitious they may be, these fisher-folk, clannish and remote, for they are far from the bustle and riot of cities and near to the simple, elemental, mysterious things of which they are never unaware. Their lads have gone to the trawlers and drifters, Captains Courageous all, sweeping the seas as far as the Arctic Circle for fish, and the Admiralty prizing their worth enlisted them to sweep the mines, for it was the trawler types that

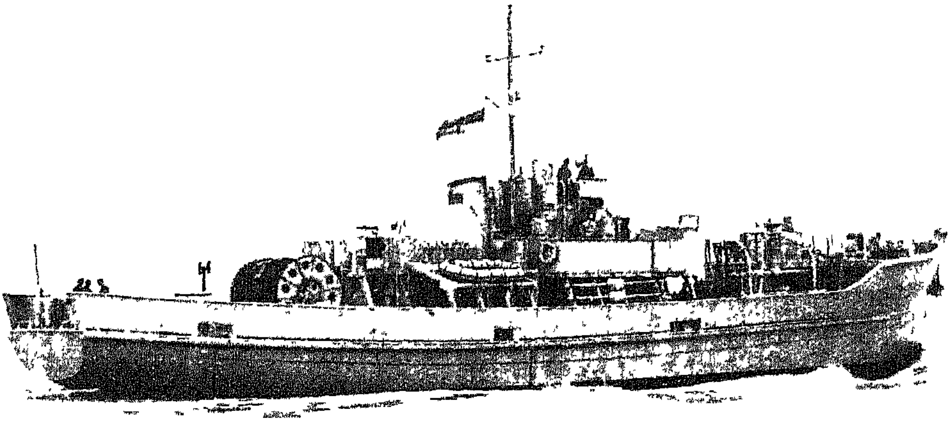


A SECTION OF S.T. "PROTEA" (198 TONS DEADWEIGHT)

This modern steam-trawler was built by Hall-Russell and Co., Aberdeen. She is 131 feet long and is fitted with triple-expansion steam engines.

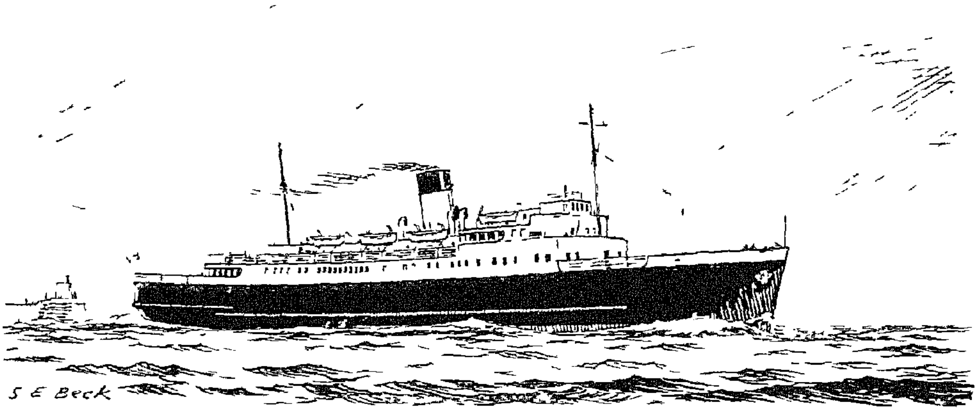
Reproduced from a drawing by Laurence Dunn by courtesy of the [illegible] Hall-Russell Ship and Journal" were adapted for these dangerous tasks. The corvettes, which fought many a gallant action, were developed from the design of catchers used in pelagic whaling, and it was an improved corvette of greater length and more powerful engines that became the frigate

When first the trawlers came to beat the fisher-boats out of the trade the fishermen would share together and invest in one or two according to their funds. But sometimes catches were poor, most times prices were bad, and sometimes too the vessel never came home. And poverty came to the fishermen. Then came the fishing companies with their organized fleets and bigger capital resources The Scottish fishing-fleets followed the herring down the North Sea, unloading their thousands of crans of fish at Grimsby and Hull and Lowestoft to be barrelled, and salted, and boxed for export, or for the waiting fish-trains to be delivered in our own markets. John Grierson, in his film *Drifters*, has let us glimpse at the fishermen's trawl. Hard and bitter work in comfortless vessels, and often ill-equipped to earn a livelihood uncertain as Nature and man can make it. Our pre-war trawling-fleet numbered 1474, but of these, according to the Ministry of Agriculture and Fisheries, 383 were lost during the war and a small number have been scrapped. Our fishing-fleets are being rapidly restored, for world food shortages following the war create an ever bigger demand for the harvest of the sea. The old weather-beaten trawlers have had their day, and a brave day it has been. The great experience of the war and the fine traditions of the past now have to combine in providing fishing-vessels with standards of amenity for the crews, with modern gear to meet new



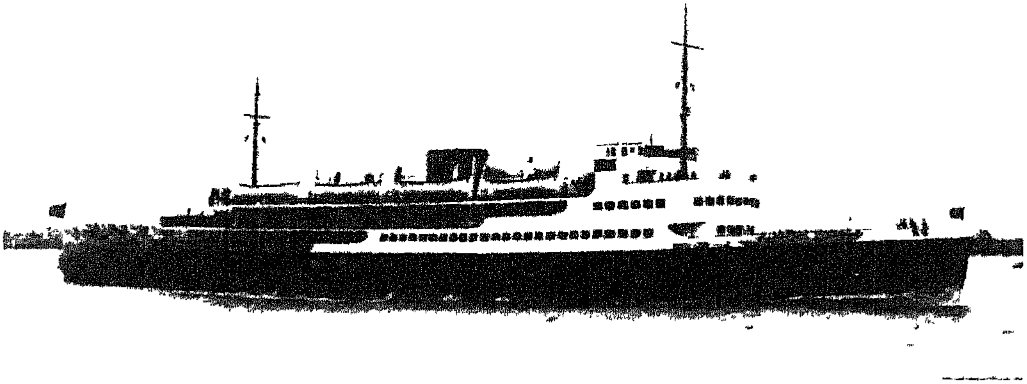
A MOTOR MINESWEEPER, BUILT ON THE DART, NEAR TOTNES
This vessel is 126 feet long, and has a Diesel-engine drive
By courtesy of Messrs Frank Curtis, Ltd

methods of fishing and processing, and with increased cubic capacity. Aberdeen is justly famous for its building of fishing-vessels. The steam-trawler is still favoured, though the motor-trawler has already made its appearance. Fine examples of the modern fishing-vessel are the two 160-foot steam-trawlers for Irvin and Johnson (South Africa) Ltd., the two 210-foot Grand Bank type steam-trawlers for the French Government and Correa of Portugal, and the 125-foot motor-trawler for the Walker Steam Trawl Fishing Company of Aberdeen, built by Hall-Russell in their Aberdeen yard.



A CROSS-CHANNEL PASSENGER STEAMER (2000–3000 TONS)

This type of small ships, like miniature liners, have most comfortable accommodation. The night boats are fitted with single or double-berth cabins. Their speed is about 20–25 knots.



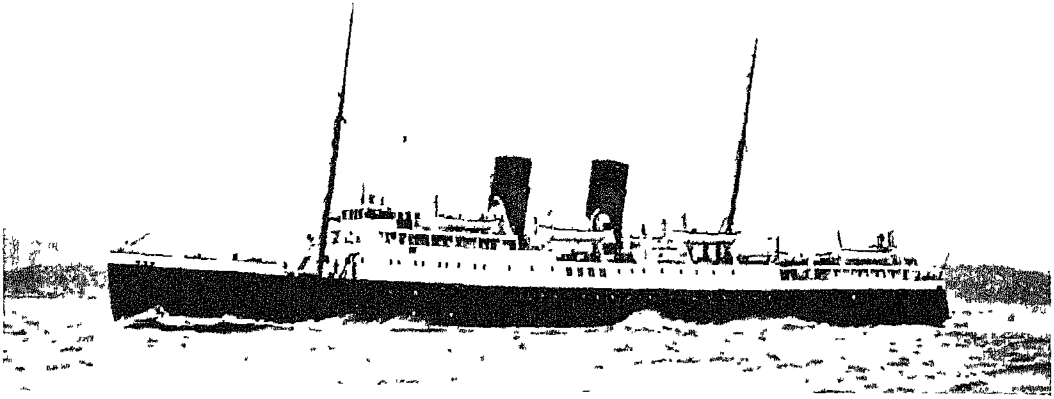
M.S. "PRINCE BAUDOUIN" (3050 TONS)

This ship was built in Belgium by S.A. John Cockerill for the Belgian State Railway and was engaged in the Dover-Ostend service. She is the fastest cross-Channel vessel, attaining a speed of 25¾ knots.

Photo Nautical Photo Agency

Cross-Channel Steamers

Nor must the passenger liners in miniature, the cross-Channel steamers, be omitted. These ships which sail between England and the Continent, the Channel Isles, and Ireland sail in all weathers, many of them at night, and we accept their promptness of sailing and arrival as we do that of a railway train. Beautifully built, appointed with the luxurious attractions of an ocean-going liner, fitted with every modern navigational device, they cross narrow but stormy seas, battle with currents, fogs, and sudden gales, and not only sail on time but keep time. Apart from the loss of the *Berlin* at the Hook of Holland, they have hardly had a serious accident. The Isle of Man pleasure-steamers and mail-boats sailing from Fleetwood, Liverpool, and Barrow-in-Furness belong to the same class of fine and consistent performance. These Channel packets have had their rivalries too, and it was a classic fight between the City of Dublin Steam Packet Company's ships and those run by the London and North-western Railway; a fight in which all the armoury of relentless competition used by the wealthy and powerful railway company failed to dislodge those swift little liners with their destroyer funnels.



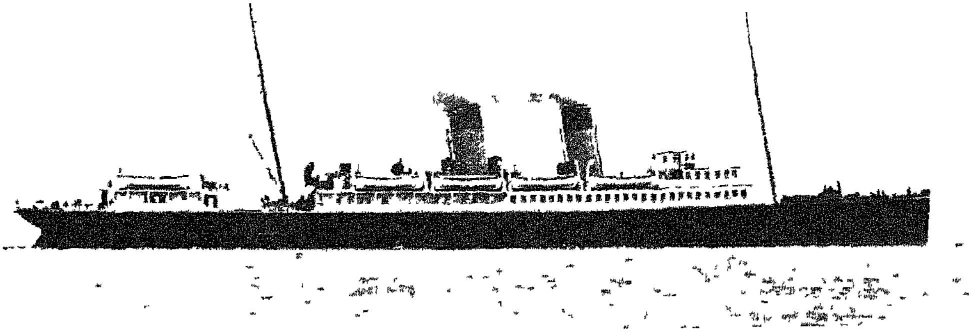
T.S. "Isle of Sark" (2200 Tons)

This ship is engaged on the Southampton-Channel Islands service. She was built by Denny of Dumbarton for the Southern Railway

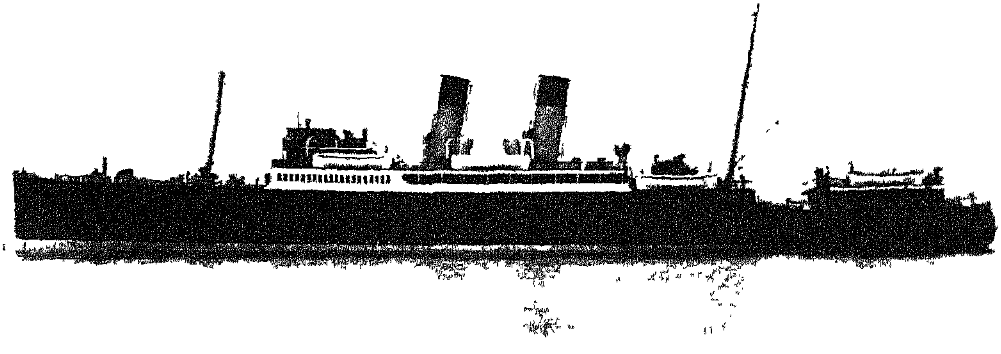
By courtesy of the Southern Railway

The threat of air competition to 'packets' may demand ships of a new type. Increased facilities means increased criticism, so that packet-owners must be prepared to iron out all petty inconveniences and annoyance and lay out considerable capital on both stationary and floating material if they are to hold their own with the air services.

Small craft! It was an armada of Britain's small craft, every kind of ship that would float the Channel that made that miraculous rescue of our armies at Dunkirk—trawlers, drifters, ferry boats, cross-Channel steamers, tugs, barges, yachts—a motley fleet. It crossed the Channel again and again, and many were lost, but the men who sailed them



T.S. "CAMBRIA" (3,462 TONS)
This ship was built for the L.M.S. by Denny of Dumbarton for the Holyhead-Dublin service
By courtesy of the L.M.S. Railway



T.S. "PRAGUE" (4220 TONS)
This vessel was built by John Brown, Clydebank, for the L.N.E.R. She is engaged in the Harwich-Hook of Holland night service
By courtesy of the L.N.E.R.

came from a sea-girt land. The salt-water is in our blood, and the sea is our "natural element," as M. Maisky, the Soviet Ambassador, remarked. The men who fished the bleak North Sea, the men who coasted round our shores in dirty little steamers, the men who sailed the barges and the yawls, the yachtsmen and the men who played with yachtsmen—all who could sail a boat faced the hazards of the crossing on a heroic mission. Small craft have their Odyssey too, and it was written for our generation at Dunkirk in May 1940. And it was small craft of high-powered, fierce, and fast seagoing motor-boats that became the "Yachtsman's Navy," that gallant force of little craft who accomplished such big things serving with coastal forces. For what were they fighting, for what did they work, endure, suffer, and die? What spirit and what vision moved these men at sea and on land, and their womenfolk too, in the face of overwhelming adversity to carry on? It cannot be better put than by Joseph, in J. B. Priestley's fine play *Desert Highway*: "We're fighting for the real democracy, which is something more than having an occasional vote. It's the belief that all human beings are precious to God, and that therefore all human beings must be precious to each other, and that the will of God shall be done on earth as it is in heaven."

CHAPTER XV

POLITICAL ASPECTS AND REFORM

Competition and Co-operation—The Future of the Big Passenger-liner—The Passing of the Tramp Ship—Standard Ships—Reforms in Accommodation—Education and the Seaman—Problems of Shipowning—Dockland To-day—Summary and Conclusion.

> Forward, forward let us range,
> Let the great world spin for ever down the ringing grooves of change.
>
> TENNYSON, *Locksley Hall*

IF the nineteenth century was Britain's century, who will claim the twentieth? Is it to be America's or Soviet Russia's, or, in the words of Henry Wallace, the American author, that of "the common man"? Are we to move forward to that larger abundance and true commonalty of which men have dreamed, or has the lesson still to be learned that our common calamity can only be truly repaired by common action—by real co-operation between peoples and within peoples.

Competition should be complementary and not antagonistic to co-operation. Competition with its spur of healthy rivalry makes for progress. It is not competition itself that is wrong but the ends of competition. If competition is used destructively and selfishly then all the genius it employs is debased. If competition is used constructively to serve the common good then all its efforts are enriching. Such competition is not anarchic and piratical, for since it is directed to mutually desirable objects, and aims at a more efficient communal service, it is not a conflict of ends but of means. We need all the enterprise, ingenuity, and inventive powers, all the originality and creative ability we can muster. Without competition we should grow static. Without co-operation all the bellicose impulses are released. This last war has been the masterpiece of a superlatively organized co-operative effort, but its process was destruction. Destruction is incomparably more rapid than construction, and reconstruction must be as internationally concerted.

The 'final cause' of a commonwealth—an ordered society for the common weal—is, in the words of Hobbes, nothing else but the abolition of "that miserable condition of war which is necessarily consequent to the natural passions of men when there is no visible power to keep them in awe."

The Future of the Big Passenger-liner

The development of the aeroplane and its potentialities as a rapid means of transport is bound to considerably influence the world of shipping. It is the future of the big passenger-liner, the ships of over 20,000 tons gross and beyond, that is uncertain. The air-liner will cream off the high-cost travel, carrying those passengers whose insistent demand is to arrive in the shortest possible time. Those who travel by sea will do so because they prefer sea travel, very high speed will not be the first consideration. The passenger-cargo liner Diesel engined to do an average of about 18 knots, comfortably but not luxuriously furnished and offering cheap rates of travel, seems likely to be the future of the power-ship. Indications already point that way.

Monsieur Pierre de Malglaive visualizes such a development of the French mercantile marine, the Rotterdamsche Lloyd have already anticipated this course for Dutch mercantile shipping, the Swedish-America Line is striking a new path for the future in her recently ordered 11,000-ton-gross ship with a speed of 19 knots and accommodation for three hundred passengers, either in cabin and third or in one class for the service between Gothenburg and New York. Cunard-White Star is arranging for the construction of a series of new passenger-cargo ships carrying about two hundred and fifty passengers. The company has four 13,700-ton cargo-passenger liners in building mainly intended for the Canadian trade. They will also call at Boston and New York. President Roosevelt gave the same direction to the American mercantile marine. Comfort, cheapness, moderate size, equipped with adequate power—these appear to be the requirements. High standards of decoration and furnishing, yet free from ornateness and *baroque* extravagance will make the ships attractive, and though in no sense luxurious, the vessel will be all the more comfortable to travel in. Space will be easily convertible as between passengers and cargo, so that ships can be used economically. It is the passenger-cargo liner which is designed to solve these problems that has an assured future.

If we exclude such specialized craft as tugs, barges, lightships, and trawlers we can classify the merchant vessels under three headings:

(1) *Express Services*: carrying passengers, a little high freight cargo and mails only. This group includes the cross-Channel steamers.

(2) *Intermediate Services*: carrying passengers and cargo only. This group has a range of speed only a little less than the express.

(3) *Cargo Services*: carrying primarily cargo with occasionally a few passengers. Vessels are allowed to carry up to twelve passengers without requiring a passenger licence. This group includes the tramps and tankers.

In a very real sense they are all cargo boats, for their freight, be it passengers or goods, is their livelihood, and right up to the present century the British felt no intense competition in the cargo trades. That is why the spur of competition stimulated such rapid and extensive progress in the ships engaged in the first two groups. For the purely cargo services it was enough to know they were stalwart in construction and engined sufficiently to beat their way from port to port. That is why a comparison in the appearance of a fine-lined, well-proportioned, smart modern liner, which seems to exude efficiency in the pride of her bearing, with that of a hard-working bluff-bowed, ill-kempt, dingy old tramp-steamer is so striking. One ship has moved with the years, alive to every inventive change, the other has been content to plod along indifferent to the changing scene and is now out of joint with the times.

When the foreign competitor entered the freight trades he struck at the Achilles heel of the Merchant Service. America will come out of this war with a bigger and more efficient merchant fleet than ours, with perhaps 1000 fifteen-knot Victory ships. The United States Maritime Commission proposes to spend £250 million on post-war shipping. The old cargo-boat, doing from 8 to 10 knots, and fitted with old-fashioned out-of-date equipment, cannot compete against these smart, fast, electrically equipped carriers. Much has already been done, and many fine express British cargo vessels, fitted with every modern device for reducing labour and for efficient handling of cargo, are at sea, and their type is multiplying, but they do not make up the bulk of our merchant shipping. On the contrary, a large percentage of our merchant ships are obsolete, slow, and inefficient, with quarters that any health officer ashore would condemn as unfit for human beings. The promise of a seamen's charter is good, but the best way to implement it is for the Government to see that we get the right kind of ships so that the Merchant Navy can keep to the seas that our Royal Navy has made safe for us all.

Standard Ships

The right kind of ships will be decent to live in. It was the standard ship, laid down in the Government building programme in 1916 to meet the shortage that first emphasized the importance of the crew's living-quarters. Their design, prepared under Government supervision, was revolutionary in this respect, as well as in their mass production. For the first time there was real official control over the accommodation assigned to officers and men in trading-steamers Their quarters were made more comfortable. The crew were transferred aft from the traditional forecastle to the poop. Instead of all the men being herded together in ill-lighted, ill-ventilated, crowded sleeping-quarters, they were provided with separate cubicles, each containing two berths, and the mess-room was reserved for that purpose alone. No longer had the men to eat and sleep in the same place. A smoking-room was provided for leisure hours. Their quarters were steam-heated, and a still bigger innovation was the provision of a bathroom for the use of the crew. In these Government ships there was consideration for the conditions under which our merchant seamen live. There are too many ships at sea to-day, dirty little tramps, colliers, trawlers, with crew's quarters that are shocking. If passengers on some of our luxury liners in pre-war days could have seen the places allotted to the crews they would not have felt so comfortable. This is the sea service which, during the last war and again this time, had a higher death-rate than any of the fighting services. Do they not deserve better of us? It is a hard enough life under the best of conditions. But seamen are away at sea so long and so often that their voice does not easily make itself heard in the general clamour, chiefly because they are out of touch with home, with the result that their case is neglected, if not forgotten.

Conditions of accommodation for seamen are improving. Very slowly, it is true, but in most modern ships seamen have berths for four and mess-room and bathroom. Accommodation is either amidships or aft. Better furniture and fittings have been supplied; ventilation, heating, and lighting have been improved, and refrigeration installed for food. All credit is due to those enlightened shipowners who have recognized that the needs of the crew are greater than those of the cargo. Again, during this war the Government ships have set a standard. Under the existing Merchant Shipping Acts the square-feet provision per man of space allotted to seamen's quarters is twenty-seven while in the Government's ships it is fifty-two.

Strange it is that the most prevalent disease among men on a steamship is pulmonary consumption, largely attributable to bad sanitary arrangements and the absence of pure air. The death-rate, *excluding accident and shipwreck, is the highest in any occupation.* Admittedly the men are not free from blame. Pulmonary consumption is often largely due to another kind of consumption. Some are apt to think they can live on alcohol exclusively, combined with the usual distractions of sailors ashore. Many are the complaints, too, of men who close ventilators which are provided, preferring the fug of the seamen's quarters to fresh air. But inefficient ventilation that creates draughts can be as objectionable as no ventilation.

Education for Seamen

So much might be done. Here are officers and men often confined to their ships for weeks at a time—in tankers often months—with nothing to do in off-duty time but listen to a blaring wireless, play cards or darts, or read trashy magazines. In extenuation not a little of their weaknesses, follies, and the vices that flesh is heir to, is due to the nature of their calling. It is a step forward in the right direction that tanker crews, in some compensation for the long sea service and restrictions against smoking imposed for safety's sake, should be paid a compulsory 7½ per cent. increase above basic rates. It is good that tanker companies, recognizing the hardships, generally speaking, make their men comfortable and are not indifferent to their welfare. The Anglo-Saxon Petroleum Company has a very attractive provident fund for employees at sea. But it is not enough. For what are wages if men do not know how to spend them. There is only one remedy—education. And education must begin with youth—the rising generation.

The most depressing fact is not only the unstable moral character of some of our seamen, but also its partial cause—the utter lack of ability to entertain and occupy themselves. It is characteristic of present-day life. The cinema and the tavern are the only goal of the large majority. We must above all things educate for the leisure time which is likely to be more abundant. It is only by and through education in the appreciation of vivid values in every department of life, and especially the cultivation of those aspects of life which have long been recognized as sources of valuable experience —literature and the arts—that we can hope to lift this social problem out of the pit. We must seek a new creative society, of which the craftsman is but a parable and a pale analogy; for the sailor's offences are only one illustration of our failure to find "the order of precedence in human affairs," which Confucius said is the beginning of wisdom.

Education in schools has gone off the rails. A cynic might observe that State educational finance has been chiefly concerned with national efficiency out of fears for national security. The emphasis has been always on more and more technical education. The classic side of our public schools is empty, the modern side is full. This is not to decry in any way the need and value of technical education. It is to point out the need for balance. A man must learn how to earn his daily bread, but man cannot live by bread alone. Nor can he live without it.

There is an awakening to this need for cultural training as is shown not only in the modern curricula of schools and the facilities which education authorities now offer —the Youth Movement, in particular the Sea Cadet Corps, with its forty thousand members at the close of the war, is on the right track—but in the schemes now operating for education in H.M. Forces. There should be a closer alliance between the education authorities and the seamen. There should be somebody directly responsible. It must begin at school at the pre-sea stage. In the schools training boys for the sea an appreciable part of the time should be devoted to such subjects as music, literature, painting, modelling, and handicrafts. After all what is education in the best sense but appreciation —praise for 'fine things' brought to 'fine issues.' These boys will one day be men at sea. With such a training behind them life will become genuinely interesting. They are privileged in the sense that they travel the world, but having eyes they see not because they have never been taught *how* to see. Not all sailors are going to be novelists, artists, or poets, but there is not one of us who would not look again more earnestly to share their vision. If inventors of machinery, as Samuel Butler says, have given mankind supplementary extra-corporeal limbs the poets have given us a nobler gift; they have opened windows in our souls.

Why should not sailors at sea—officers and men—join together in amateur productions of plays? The British Drama League could help with copies. Here is a community effort—carpenter and electrician sharing with the producer and the players. Any enthusiastic amateur actor will speak with enthusiasm of the joys of rehearsal. A wide field of dramatic literature is open to play-reading, another delightful exercise. All sailors love to sing. Why should they not receive a training in choral singing and in sight reading? In Elizabethan days the folk would sing in company, reading at sight, part songs and rounds. And there is a rich musical repertoire of the sea. Self-made music well played is particularly welcome on a ship. Why cannot a ship make up an orchestra out of its officers and men? Under far less congenial surroundings the 'star' prisoners in H.M. prison at Camp Hill, Parkhurst, Isle of Wight, where there are the beginnings of a valuable social experiment, run a successful amateur dramatic society and their own orchestra. All it needs is leadership. Then there is painting and drawing. Many sailors have natural aptitudes for sketching and water-colour drawing and they should be encouraged and trained. Exhibitions of works and examples of craftsmanship could be organized, and it would not be difficult to persuade artists of repute to come and give a criticism. Sport too has its place, and within the limits of a ship, much fun could be got from the sporting events. There should be talks on books with libraries available and a taste for intelligent reading developed. Why should sailors not share in the cultural heritage of our race? Don't begin with the classics, begin with contemporaries and excite the interest. Appetite matters more than taste. It could be done. It is being done with troops to-day.

How many sailors can converse fluently in a foreign language? Very, very few. Why? Because they are not encouraged early enough. Apart from the cultural advantages and the opportunities for learning through the mutual interchange of conversation something of the outlook of other peoples, a master's prestige goes up tremendously in a foreign port when he can hold his own with shore officials in their own language. The seaman loses so much pleasure too through lack of accomplishments. He should be taught, and taught early, how to make himself desirable socially. How few of them can express themselves except in violent language, which is merely a reflection of their inarticulateness. As a race of men they are full of sterling qualities. They are intelligent and adaptable, yet how difficult they find it to fit into another occupation. They take to the sea because "that's the life for me," but they may be kept at sea because their avenues of education have been so limited that they have no other choice. A ship's crew is a community in itself. Its talents should be mobilized to make it not just a crew of men working a passage with no outlook but the release and relief of shore excitements but a true company with a social fellowship, alive with intelligent interests and sharpened critical faculties. Mock parliaments, debating societies, gramophone concerts—why not?

For their mutual benefit the floating staff and the shipping company might exchange confidences and develop together the plan of operations. A share in the benefits accruing from such proceedings would serve to strengthen the ties of mutual appreciation. Much could be done in this direction by an enterprising company. Cadets might spend a voyage ashore in the office, a place usually associated with everything to be feared, as well as six months in the shipyard where the company's ships are normally built. This is the way to a complete training for all contingencies.

What shall we do with the drunken sailor? First admit society's responsibility. A good education, security of employment, clean, comfortable quarters, civilized amenities, and a good wage will make for self-respect. Let him feel that not only does he belong to the ship but that the ship belongs to him. Let him share, through his representatives, in the ship's organization, and it will increase his interest and sense of responsibility; and to let him feel that his ship is not run primarily to line the pockets of private owners but in the interests of the general community is to make him a citizen. For a free citizen in a civilized order must have a sense of public responsibility. Millenniums are the figments of dreamers. No legislation nor State control will achieve a perfect world, but the way of true progress is in the direction of the greatest happiness for the greatest number. Happiness is not bought but experienced, and this can only be under conditions that permit it. That will depend on the sort of society we create. Men will rejoice together when there is full sense of community, equality, and mutual dependence. Only in such an environment of creative living shall we escape the mass depravity of taste, the gross utilitarianism of outlook, the admiration of ostentatious trappings, and the herd mind. Then we may discover a real popular culture, expressive and restorative, something "to make glad the heart of man."

> What is man
> If his chief good and market of his time
> Be but to sleep and feed? A beast, no more.

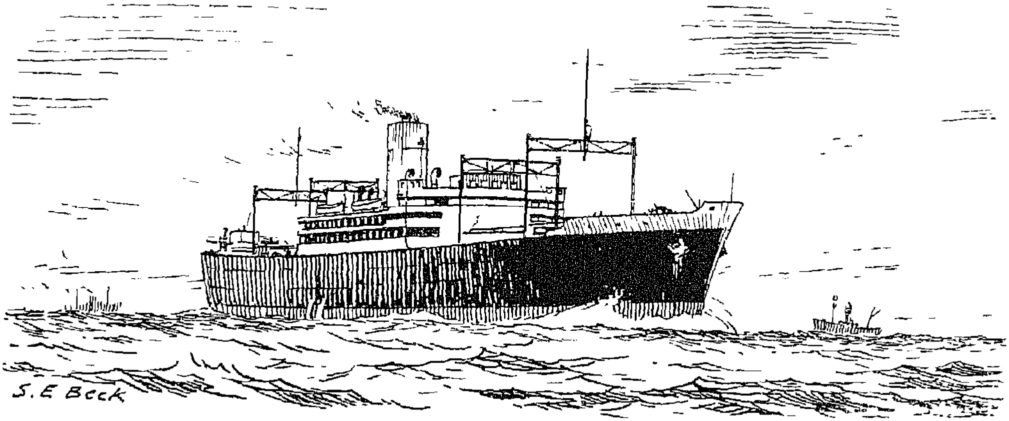
There are always those who are ready to point out that the men make their own conditions. Slums, they say, are not due to poverty but because their dwellers waste their money on drink and 'the dogs' and dump coals in the bath. People moved out of slum houses into a garden city do not respond at once to better surroundings. Habit is a ruthless master. The sinister feature of the argument that improvements are not valued and opportunities are wasted is that it is made the excuse for doing nothing. Patience, perseverance, and faith are needed, and if these reforms were put into being the coming generation of seamen would not shame their kind. Environment has a determining influence on character. Isolation would be robbed of most of its hardships, and men would share "a life to which the perception and creation to beauty," in the words of William Morris, are "felt to be as necessary as daily bread."

It is essentially a moral question. The seaman too has been his own worst enemy as well as an enemy to the cloth generally. A master sometimes risked overloading to curry favour with the owners, and how many masters were there who did not stoop to make money at the expense of the crew's food? This was a cause of perpetual dissatisfaction leading to much trouble and ill-will. Seamen seldom received the amount of food paid for by the owners. In a world of money values justice has no meaning. It is necessary to distinguish between the things which increase life and improve its quality and the things which diminish and degrade it.

There is much room for a stricter surveillance of the keepers of Sailors' Houses. Praise is due to such excellent organizations as the Seafarers' Education Service, which provides libraries, to those progressive shipowners who seek the co-operation of the education authorities and to all kindred efforts to improve the standards of culture and taste and to create a spirit of self-respect. As yet all such movements are only touching the fringe of the problem. The Arts Council of Great Britain, formerly C.E.M.A., who have done so much to take the finest of our cultural works in literature, drama, painting, and music out to the small towns and villages, might find a useful opening among merchant seamen. It all wants organizing into a definite educational policy. Seamen do not want patronizing or preaching to, but if the right approach is made they are a responsive audience. Praise too is due to the great work of rehabilitation undertaken through such efforts as those of the Liverpool Seamen's Welfare Centre, provided by the generosity of Liverpool shipowners with their Ocean Club and the Lakeland rest-home of "Summerlands," purchased out of a gift from King George's Fund for Sailors. But the fundamental problem remains to be solved—the problem of raising a generation of seamen who will not be just skilled artificers, specialists knowing more and more about less and less but men with wider interests in civilized living.

Advances in Shipbuilding Methods due to the War

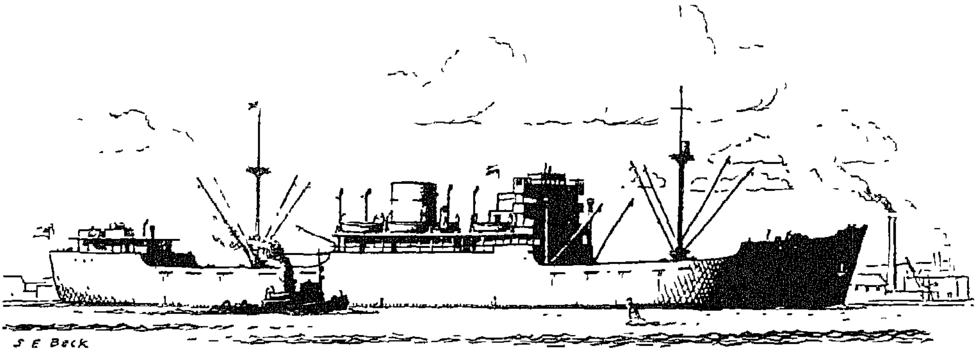
During this last global war our shipbuilders met every demand, and now that the security silence has been lifted an astounding record of achievement is being revealed. Advances in metallurgical science and engineering practice; advances in methods of construction and design; new inventions, processes, ideas; new ships and new types of ships—what data for the historian! Steam- and motor-tramps with 40- and 50-ton derricks, cargo liners converted into troop-ships, refrigerated food-ships, coasters and tankers, colliers, barges, tugs and puffers, M.A.C. ships, the harbour at Arromanches, the laying of Pluto—a miracle of industrial enterprise and co-operation. What an epic the merchant aircraft-carriers have written fighting U-boats and providing an umbrella against air attacks on our convoys! These converted merchantmen under their own captains, flying the Red Ensign and carrying personnel of the Fleet Air Arm, were like miniature floating airfields, with their flight-decks, on which pilots made postage-stamp landings. These defensive ships played a vital part in winning the Battle of the Atlantic.



A Steam-driven Cargo Liner

This is a typical ocean-going vessel on the North Atlantic service. She is about 500 feet in length and has a speed of approximately fourteen knots. The 'goal-post' masts permit of speedy handling of cargo.

Our ships were not mass-produced like the American prefabricated ships from the Kaiser yards, though small craft have been built this way during the war. These American assembly-yards stood at the end of a chain of factories reaching across the continent, mass-producing the component parts and using electric welding on a scale never before attempted. We had neither the space, the labour, nor the system for such quantity-production of big ships. All our steel and iron industries were at maximum production for the war and we could not find room to erect new mass-producing factories for prefabricated shipbuilding. Nor had we the tools or the resources to imitate the American belt-production. But by using our own yards co-operatively, by standardization and elimination of non-essentials, by welding in place of riveting, and by scientific procedures overcoming the flaw of welding—cracking—by the use of plastics, and a myriad innovations we speeded up production. A 10,000-ton cargo ship, which in peace-time took up to forty weeks to build, was turned out in half the time. The record for building a 10,000-ton British deadweight merchant ship, s.s. *Carlton*, is held by the Burntisland shipyard. From keel to launch took 3 months 5 days, and from keel to delivery 4 months 20 days. All this experience will be invaluable to the shipping industry in the post-war years.



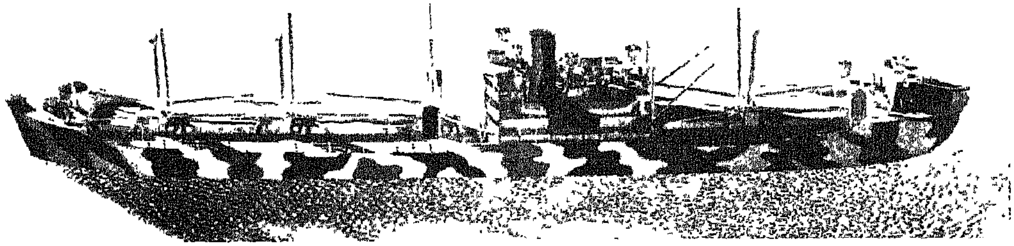
A Motor-driven Cargo Liner

Where Diesel oil is procurable economically this vessel has many advantages over the steam type, including the saving of engine- and bunker-space Her speed is about sixteen knots

The Adoption of Welding

Welding in place of the traditional riveting is a revolutionary development. Early efforts resulted in serious failures, for under the superficial perfection the core was weak. It was a constructional victory when the banes of slag, undercutting, and cracks were overcome. Profiting by American experience in the building of Liberty ships, the Admiralty Welding Committee issued its directions and guiding notes on welding to our ship surveyors. We have had to adapt the process to our own requirements, always remembering that American war-built vessels come from the conveyor-belts, while ours are not assembled but built in the yards. Riveting has not been abandoned and is still used alongside welding. Our long experience in erecting ships and our innate conservatism tend to make us cling to tried methods. And welding is a highly skilled job. It takes time to train men, and there must be the aptitude—the 'touch.' It has already passed out of the doubtful processes. It has come to stay, and the old riveting methods are being rapidly superseded. The old familiar clang of hammers in the shipyards has almost ceased. A new sound of a new method, the hiss of the electric welders, now speaks of new ships.

The information recently released by the Welding Development Department of the Lincoln Electric Company, Ltd., of Welwyn Garden City, from American sources with the approval of the U.S. Navy Department, U.S. *Maritime Commission*, and U.S. War Shipping Administration, reveals some striking facts about welding construction The famous Liberty-type ships, all built by this method, have more than established the superiority of this method over riveting. They have conclusively proved that on all counts it is more efficient, less costly, speedier, and easier of repair. Instead of the 900,000 rivet bumps on the plates of the hull of the average 10,000-tonner offering an appreciable frictional resistance, the welded hull is smooth and clean in line. Further, welding uses less steel, thus materially reducing the weight. Comparing the welded Liberty ships with vessels of the old type, Admiral Emory S. Land says:



A MODEL OF A "LIBERTY SHIP"

This name was given to a special type of ship, built during the war of 1939–45 The principal dimensions of the basic Liberty Ship are overall length, 411 feet 6 inches, breadth, 57 feet, displacement, 14,245 tons In general the hull is welded throughout, and all are motor-driven

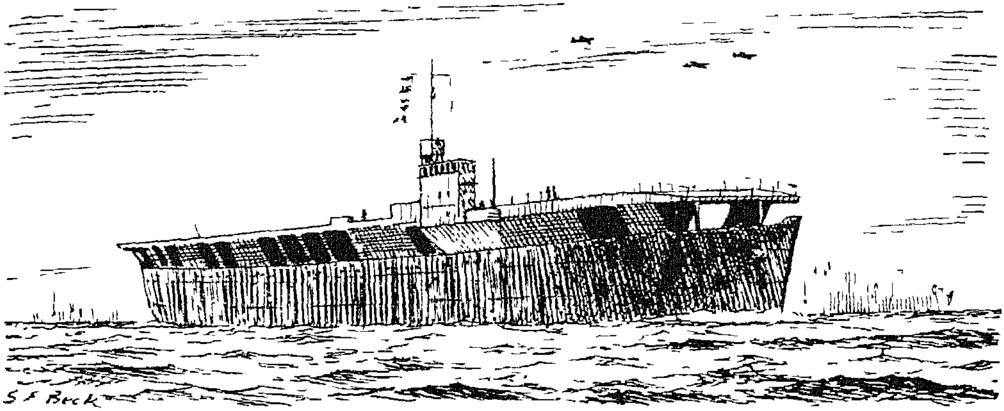
By courtesy of Bassett-Lowke, Ltd

> Every time a riveted ship goes into dock you have a lot of repairs to do which you do not have in welded ships. You do not have openings in your hulls, with dozens and dozens of leaks, nor do you have to redrive rivets. Even if we have fractured plates it is but a handful of leaks compared with the casualties in riveted ships every time they go in for voyage repairs—something that everybody seems to have forgotten.

So strong is the welded joint that when, through enemy action or other causes, a ship's plates have been torn the joints have held fast. These Liberty ships have stood up to the fiercest test, on the most perilous sea-routes. Bombed and torpedoed they have demonstrated beyond argument the efficiency of the welding process. The *Anne Hutchinson* is only one of these ships which simply refused to sink though holed by torpedoes and cut in half. The survivors said the buoyancy of the vessel, after being sliced in half, was amazing. She kept her upright position and was successfully towed into port. The Sun Oil Company were equally enthusiastic about the notable performance of their motor-ship *Pennsylvania Sun* under equally devastating conditions. The most remarkable thing of all is that these welded hulls that proved so reliable were produced at the rate of over two thousand hulls in forty months. The saving in time, labour, and material, and the compensating gains in strength and lightness of structure, achieved by welded ships make riveted construction an out-of-date method. Electrical welding has definitely superseded it.

Needed Shipbuilding Reforms

There is an old Yorkshire saying, "Dearest is cheapest," and this is specially apt in relation to Britain's after-the-war programme for merchant shipping. The slow ship may be cheap, but she will prove dear, for there will be a surplus of slow shipping at sea. The tramp, once clearly defined, belongs to yesterday, for to-morrow medium speed and indifferent equipment will be hopeless, and it will be the cargo liner, with every modern feature and a good speed, that will capture the business. The coaster, whether carrying 200 or 2000 tons of mixed cargo, will have to achieve greater flexibility, explore the methods of economical and rapid propulsion, and cease to be the echo of the 'tin kettles' of the Fulton-Bell period. The motor-coaster with its small engine developing high power, its modern design and equipment, clean, speedy, and efficient, is the vessel for this trade. That it is more costly to build and needs a better type of skilled men is offset by its greater earning-power and more civilized conditions. If transport has to be cheap at the expense of men's lives then it is too dear.



M A C., a Merchant Aircraft Carrier

These vessels were a series of merchant-ships, between 10,000 and 15,000 tons, stripped of their superstructure, and fitted with hangars and flight-decks to act as escort vessels for convoys

The cargo liners carrying general cargo have been the backbone of our Merchant Service, running to schedule and maintaining regular services. Their draught is carefully controlled, for though there are many harbours in the world and many ports to serve there is not always deep water. They are the greatest friends of the steam reciprocating engine and the 'Scotch' boiler, burning coal. Their praises have been sung by the poets; Kipling and Masefield have put them into every anthology. They have inspired the novelists, and Conrad has placed their epic among the classics. But how will they now fare in the post-war world? How many of them have kept up with the march of time? It is only the best of them that can average 15 to 16 knots, and the majority plug along at 10 to 12 knots. They are nearly all bluff-bowed, and their freight-carrying capacity is the main consideration, apart from the engine room, for as they run to schedule they must have sufficient reserve of power to make up their delays occasioned by bad weather.

They are the biggest offenders in respect to their crews, and it is from these ships most of the complaints come from seamen required to endure not only the rigours attaching to their calling but the miseries of bad accommodation. There is little comfort on an old cargo ship even under the best conditions, and it is safe to say that most foreign cargo vessels offer better quarters than the British do to their men. Though they have been moved from the fo'c'sle in many cases to under the poop, and the officers to the side-cabins abaft the bridge amidships, there is little attempt to make the men's quarters even tolerably comfortable. The bow wave at sea and the auxiliary deck machinery —*i.e.*, winches and windlass—in port for those still housed in the fo'c'sle exclude quiet. And how inadequate the provision for messing, washing, drying of clothes, or the normal amenities of life. The proper place for the men is amidships, away from the awkward shapes of the bow, which in the event of collision is more than likely to be involved, and owners and underwriters should recognize that the well-being of the crew is as essential as the well-being of the cargo. The contrast between the modern American Victory ship and the average British cargo liner, both in efficiency of equipment and men's accommodation, points the way to the reforms that must be introduced into our post-war building of general freight-cargo liners. The first of four new cargo ships for C.P.R., the 10,000-ton turbo-electric *Beaverdell*, with a speed of 17 knots, launched from Lithgows. shipyard on August 27, 1945, indicates the Clyde builders know it.

Passenger liners too, and all cargo ships carrying passengers, will have to make fresh appeals to their customers if they are to stand up to the ever-growing competition of air-liners. The ship of the future will not be able to bury us deep in a narrow bunk within a seven-foot cube, airless and blind. There will be many modern American liners where there will be nothing but rooms with an ocean view, writes Mr Jack Heaney in his stimulating observations on the ship of the future.[1] Every vessel must be provided with air-conditioning on a scale never before employed. It is not a surfeit of luxuries we want, but the comfort and grace of a well-run, artistic home. Nor do we want saturating with 'period.' Let the future passenger-carrying ship be a time-machine in a different sense, not a "flight of ages" but a vital expression of our own time and race. Arrangements, furniture, lighting, ventilation, decoration, colour, all as modern as the streamlining of the ship's hull. And do we want all these vast halls in the bowels of the ship? There we must go of necessity because in our own room we can only manage to turn round. A present-day state-room on most ships is a glorified wardrobe, where clothes are hung, plus a bed to sleep on. There are no vistas from a port-hole. We are on the sea and yet the whole conspiracy seems to be to persuade us that we are not. State-rooms must of necessity be limited in size, but far more attention will have to be given to the utilization of space to give the feeling of roominess. If passengers' personal accommodation afforded sufficient comfort and attraction to invite use, and gave a sense of possession like a town flatlet, there would be far less need for these public halls occupying space which would be better filled with cargo. Small writing-rooms and lounges with a sense of privacy would do much more to make for comfortable living. Simplicity, and appearance creating an atmosphere at once refined and refreshing, should be the aim of both designer and furnisher, and full use made of all the modern plastics. Fire-proofing, rat-proofing, dust-proofing should be elementary essentials. Temperatures should be thermostatically controlled and draughts unknown. It should not be beyond the possible to make a ship ride through the heaviest seas easily and smoothly so that the terrors of seasickness no longer exist. If the ship of the future is reasonable in its fare and fares, safe in its passage, and winning in its beauty and comfort then its passengers will not forsake her. The perfect ship would be unsinkable and fire-proof. It would be part of the sea, and we should be part of the ship, not as mere passenger cargo, but as residents in a home away from home. Towards that ideal the passenger ship of the future must boldly move. The perfect ship would be "as safe as houses," not cluttered up with lifeboats, rafts, and all the paraphernalia a ship must now carry as a constant reminder that she is not safe. There are no unattainables to the mind of man.

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[1] *Shipbuilding and Shipping Record*, July 19, 1945.

Some Problems of the Shipowner

Shipowners have many problems, and some of them are beyond their power to solve. The original cost of a ship determines the annual appropriations that must be set aside to cover interest charges and depreciation, for the life of a ship is short even when she is fortunate. Every ounce of extra speed—and higher speeds are constantly demanded—is extremely costly. Port and harbour dues tend to increase, and the wages-bill is steadily rising. Every demand for more space for the crew reduces the space available for earning capacity, and every additional amenity adds to the burden of charges. Their ships are in competition with those of foreign owners, many of them receiving direct or indirect State aid, and many of them sailing under regulations less onerous than those imposed by the Board of Trade, now the Ministry of Transport. These Board of Trade regulations apply with equal force to all steamers, whether tramp or liner, as regards cubic capacity, hours of work, pay schedules, feeding, medical attention, etc., according to type of ship. They are open to undercutting by rivals with cheaper ships and lower wage costs. The cumulative effect of all the charges to be met is formidable, and the earning capacity of the ship has its limits. The increases in maintenance and running costs cannot be passed over to the freight and passenger rates without demur, for if these are too high they will check business. They have to cope with seasonal variations in the volume of trade, and liners must sail at their appointed times, empty or full. There are insurance costs, cargo damage, which often involves litigation, brokerage charges on charters, and unforeseen contingencies to provide against, and a mounting increase in new building costs, which eventually have to be met. Hence the need in times of prosperity to create substantial reserves. Even State-owned ships cannot be steadily run at a loss, as the experience of the American, Australian, and Canadian Government-owned merchant fleets show, for they have abandoned the experiment.

The main answer goes far back. To begin with, there should be a supervision by the Government of the Home Capital Market to prevent the flotation of new shipping companies that cannot be economically justified. This would eliminate the speculator and adventurer and free the established shipowner from conscienceless internal competition. Next the Government should see that the capital resources of the nation are planned and directed so that the available supply of credit and savings is used for the national advantage, and not frittered away on undesirable ventures. The State should act in the capacity of financier and provide capital for shipbuilding on loan at either no interest or very low charges. And in the same way it should guarantee the underwriting. A Board of National Investment, controlling capital issues, would do much to rule out redundant companies, and thus prevent domestic rate-cutting, and it would help to ensure that shipbuilding was planned to avoid surplus. The new National Investment Council set up by the Government in the Borrowing (Control and Guarantees) Bill, 1946, will impose a stringent control over lending and borrowing, and help the State in the planning of capital projects.

Research should not be left to be borne by private enterprise, though the industry does not neglect it. In 1944 the British Shipbuilding Research Association was founded, and it is widely representative of technicians and practitioners in shipbuilding. In 1945 the Turbine Research Association was inaugurated to study turbine propulsion. His Majesty's Merchant Navy, to give it its full title, is a vital part of the nation's life, and it should be the Government's responsibility to see that active and unstinted research into all the problems with which it is faced is carried on—hull design, propulsion, principles and methods of construction, the most efficient use of the units of energy developed, the use of new materials and alloys, the potentialities of the internal-combustion engine, and of the gas turbine applied to marine engineering—all the many issues arising in ship-construction. With data and the shipbuilders' experience, there can be direction to meet the needs of the future.

Some Problems of the Shipbuilder

Shipyards that lack space and modern equipment, and are only functioning because of the abnormal demands created by the war, must either be closed down or modernized. One good result may come out of the war, and that is the proposed shipping-shipbuilding plan which the British shipowners and shipbuilders have drawn up at the suggestion of the Government. New shipbuilding is to continue to be licensed, and all shipowners, whether they have financial interests in the building-yards or not, are to be on the same footing. This regulation of new construction and repair work will help to prevent a recurrence of the chaotic conditions which followed the last war. It will aim at securing the even spread of orders in the shipbuilding yards and the control of prices of ships, so that these are compatible with their economic operation. By such orderly planning it should be possible to ensure the regular employment of shipyard workers. There can be no criticism of these objects. If they are carried out in the spirit of mutual co-operation which was so marked a difference between the war-effort and the pre-war competition' there is a brighter outlook for the industry. We can no longer afford anything less than' maximum efficiency—elimination of man-hours from non-essential work, every method of shortening production processes, removal of bottle-necks impeding the flow of materials —nor can we afford to go back to the pre-war disorder. The Trade Unions can help. In the building of a ship there may be twelve different unions covering thirty-six different trades, some of them so closely allied that it is difficult to decide which job should be done by which tradesman—often a source both of friction and delay. Administrative and constructional efficiency can be secured in peace-time as in war-time, and planned production is the way. All these reforms, which the new shipping-shipbuilding plan proposes, are to be welcomed on still another count. They come from the industry itself. Self-discipline is always better than imposed discipline. Control by consent is freedom. Control by regimentation is tyranny. Control by consent means the acceptance of a new social morality. Does this promised regularization of the shipping-shipbuilding industry in functional matters apply with equal force to human matters?

What of the human relations? There is a bad legacy here. Before the war there was mutual distrust and suspicion, bred by the feeling that shipbuilding yards were deliberately abandoned in the profit-interest of the remaining yards. Long spells of unemployment are not calculated to breed a spirit of sweet reasonableness. The men must have a share not only in the questions concerning hours and wages and general working conditions but, through their representatives, in the general control. There are technical factors and matters relating to fatigue where their contribution can be valuable. It is clear that if there are strained social relations there cannot be maximum efficiency. And it is equally clear that private, competitive enterprise, as far as the shipbuilding industry goes, before the war was not operating in the way dear to text-book economists. Shipbuilding is a national interest and must be nationally controlled. The future welfare of the workers, no less than the prosperity of the industry, entirely depends on the utmost advance in output a man-hour by modernization of equipment, management, and organization.

The shipowner too has a right to be protected against the competition of foreign owners' rate-cutting with ships that fall below the standards of safety, accommodation, and wages that he is compelled by law to observe. Shipping is essentially an international, as well as competitive, business, and it can only be effectively controlled by international agreement. Just as in the interests of safety it has been possible to get international agreement on the rule of the road—"green to green, or red to red"—so, in the common interests of fair dealing and fair treatment, it should be possible to have agreed, international laws respecting load-lines, safety regulations, wages, crew accommodation, chartering, marine insurance, owners' responsibilities and liabilities. But the impulses of greed and power are strong. Not until 1914 was there a draft on Safety of Life at Sea. If international agreement cannot be secured on matters vital to the well-being of the mercantile navies of the world then progressive nations must protect themselves by bilateral agreements. In this rapidly shrinking world it is necessary that the maritime nations should confer on all major-policy matters and seek agreement.

As Lord Halifax said, "The plain fact is that we must revive our shipping and our overseas trade not in order that we may live well but in order that we may live at all."

War-time Shipping Losses

UNITED KINGDOM AND COLONIES SHIPPING POSITION[1]
(1600 gross tons and over)

	MILLION DEADWEIGHT TONS					
	Dry Cargo		*Tankers*		*Total*	
Position at September 3, 1939		17·7		4·4		22·1
Gains						
New building	7·0		1·7		8·7	
Captures	0·6		0·1		0·7	
Acquisitions (not returnable)	1·1		0·2		1·3	
Acquisitions (returnable)	4·4		0·2		4·6	
Total Gains		13·1		2·2		15·3
		30·8		6·6		37·4
Losses						
Pre-war tonnage	10·7		2·3		13·0	
Tonnage acquired during War	4·5		0·5		5·0	
Total Losses		15·2		2·8		18·0
Position at June 30, 1945		15·6		3·8		19·4
Less returnable acquisitions		3·4		0·1		3·8
*Position after returnable tonnage returned		12·2		3·7		15·6

* Subject to losses and gains after June 30, 1945.

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[1] It is not possible to prepare an analysis on this basis of United Kingdom shipping alone (*i.e.*, excluding vessels on colonial registers), but the fact that the figures are not appreciably affected by the inclusion of vessels on colonial registers is seen from the fact that at September 3, 1939, these totalled 0·5 million tons and at June 30, 1945, 0·2 million tons.

These statistics, presented by the British negotiators of the American loan agreement, are from the *Economist*, December 15, 1945.

How critical the post-war years are is reflected by the urgency of the American loan, which is intended to provide the necessaries to tide us over the period of reconstruction, for if we are to resume our former place among the industrial nations, or even to earn the imports of food to feed our people, a tremendous effort is necessary. Having faced these losses, not only in shipping but in all our national assets, it serves no purpose to go on complaining and protesting against the "slings and arrows of outrageous fortune." Our national crisis is also our national opportunity; an opportunity to rebuild, re-equip, and refurnish our industries, and, parallel with scientific, technological, and administrative reforms, humanize conditions for the workers so that honest, decent, hard-working men can feel proud and happy in their work. In shipping, and in all the activities linked up with shipping, we must not only build up our losses with more efficient fleets but also build up goodwill and fulfilment in human relations. Government and industry must be united in purpose and co-partners in effort. In the words of Sir Clive Baillieu, "We believe Britain's future can only be assured if we reproduce in the days ahead the close and intimate understanding which linked Government and industry together in the war." In shipping it is not enough to have the strongest Government pledges of support—there must be consultation and direction. With planned objectives based on the logic of our needs and the ethics of social justice we can bring a new spirit to action and a new hope to men.

The men too must do their full share. In the old order of social and industrial values it was money, machines, and men—and in that priority. The revolution of our times is that we have put man first. The old disciplines of poverty and punishment, the gutter or the workhouse, are no longer the operative incentives to work. But the introduction of comprehensive security legislation providing against unemployment, accident, sickness, and old age, and the conciliation machinery for settling disputes, call for a new social discipline and throw a new responsibility on the worker. To be set free from the compulsions of poverty is not to be released from the duties of service for the common weal. The strike, the 'ca'-canny' or 'go-slow' methods which were defensible forms of protest in a society which failed to recognize its duties and obligations, and relied on the motives of fear to obtain its labour, is no longer justified when those incentives have been removed. It is an inexorable truth that the wealth to ensure better conditions of living can only be created by effective work. If the worker fails to make his full contribution freely and willingly the elemental needs of the community will not be supplied, and the whole domestic economy will collapse. The implementation of the social reforms designed to give security does not rest with governments but with the people themselves. A free society can only be built on moral foundations, and it can only function by disciplining itself. To fail leaves only one alternative—the servile state.

Democracy is on trial, and it is faced with the sternest test. The whole pattern of our foreign trade has to be rewoven and our industries stimulated to maximum production. Our shipping losses of 7,000,000 tons have to be replaced. There are the psychological as well as physiological factors of war weariness and the relief from its perils to contend with, creating a mood of slackness as understandable as it is alarming in some of its manifestations. It is a temporary phase and is passing. The shipyards have made a fine start. At the end of 1945 ships totalling 1,612,810 tons, the highest since 1930, were under construction in Britain and Northern Ireland, and nearly a million tons of all-steel merchant ships were launched, not reckoning those built on the Admiralty's account. The bomb-damaged wharves have been made serviceable, the burned-out sheds have been rebuilt or cleared, the big ships are coming into the ports again, and soon all the dockers will be working full pressure. Over the broken acres of dockland—London, Liverpool, Southampton, Hull, Bristol, Plymouth—it is a heartening sight to see the tall masts and funnels of the ships lying at the quays. Though, during the war, vessels had to be diverted, these stricken ports are now renewing their old activity, and new, spacious, well-built areas are being planned that will wipe out their slums.

Dockland To-day

London River is busy again. Another chapter has been added to her story, and the implications of that story which reveals itself to all who read the show of history on Thames'-side, from Tilbury to the Tower, are full of inspiring confidence. There are the brief chronicles of a city with great traditions. From Australia, New Zealand, the Cape, Canada, and the States ships are discharging in the "Royal" Docks—the George V, Royal Victoria, and Royal Albert, and at the historic East and West India Docks, where the sugar and the tea comes in, and all manner of food-stuffs. Most of them fly the Red Ensign. At the Surrey Commercial Docks, where the precious timber is unloaded, a few Scandinavian ships are berthed. Through the sorely blitzed streets the lorries are carrying merchandise of every description. The export drive is on, and the sheds and wharves are no longer stacked with the dreadful cargoes of destruction—armaments and ammunition for the firing line—but with manufactured goods, machinery,

THE "ROYAL" DOCKS

The Royal Albert and King George V Docks and the Royal Victoria Dock are intercommunicating by deep-water passages and form the largest dock system in the Port, providing eleven miles of deep-water quays. With 237 acres of water the Royal Docks have the distinction of being the largest enclosed docks in the world.

Photo Aerofilms, Ltd. By courtesy of the Port of London Authority electrical equipment, motor-cars, bicycles from our reviving factories, anything and everything we can make or spare. London is still the greatest port in the world, with docks and quays, roads and railways, that can handle forty million tons of merchandise a year, and berth over a million tons of shipping a week along its forty-four miles of quayage. The ships are back again, stem to stern along the water-front; many of them already have changed their war-time grey and sport the bright familiar colours of their company owners. The dockers with a swift dispatch see no time is lost before they are on their way. There is a new spirit abroad, a different temper, for there is work to do and wages and conditions now make it worth doing. Phœnix-like out of the ashes and the rubble of devastated slumdom will arise in the years to come a new East End with the amenities and advantages of the West End, with decent homes, wide thoroughfares, and open spaces. It is not dreaming or wishful thinking but realism to say the slur of Dockland will vanish as we recover our industrial health, and the way to it is by responsible social action which will reassert individuality and overcome individualism—in short by a common effort for the common good. It is the clue to both the national and the international problem. In such a spirit men worked during the London raids in 1940, when the bombs blasted their homes and the flames licked their way through the wharves. Ships were on fire and some sunk in the docks, others near capsizing were saved by superhuman efforts. Divers worked in the fouled mud stirred up by the bombs. Stricken ships, bulkheads shored, plates forced open, some without bows and sterns and all leaking like sieves, had somehow to be kept afloat till dry-dock space could be found. But it was done. In that smoking inferno men must have felt, through some impulse deeper than reason, that they were fighting for more than existence. They worked and perished for a future—and shall it be denied? Not if we bring the same courage, steadfastness, team-spirit, and purpose to the tasks before us as they did in that "our finest hour." Something analogous must be found in the fires of conviction to make men serve the ideals of peace as passionately as in the stress of war.

Summary and Conclusion

The business of shipping is governed by the spirit and political make-up of the period. During the Middle Ages, when Europe was loosely united under the Holy Roman Empire, there was in existence a commonly accepted body of laws and customs which provided a kind of international code for traders, for the small world was knit together in a religious and political unity. The explosive force of the Renaissance shattered it into fragments, and with the growth of independent states there arose conflicting nationalisms. Their political and economic rivalries led to individual legislation by each country, designed either as a commercial weapon of offence or defence, and gradually the old medieval codes were abandoned. By the eighteenth century this nihilism had put in force every kind of restriction and inconvenience until there was no way for commerce to break its fetters except by violence. Navigation Acts and monopolies resulted in illegal trading, smuggling, and privateering, and these frictions developed into wars. The nineteenth century was slow to resolve these tangles, for it was an age of individualism, and traders and shipowners were engaged in fiercely competitive struggles to capture and hold markets. In the end the compulsion of necessity brought the leading shipowning countries together, when their representatives formed the International Maritime Committee. It is clear that agreements on such issues as shipowners' liabilities, common forms of chartering, and marine insurance were mutually desirable. This organization did much valuable work towards the end of the century in clarifying and simplifying the mass of confused regulations hampering the shipping business.

The principle of international control was pioneered by the League of Nations following the First World War, and a number of conventions covering every aspect of the international sides of the shipping industry were signed. Unfortunately there was no power to implement these decisions, which dealt with such thorny questions as safety regulations, load-lines, appliances, mortgages, insurance, collision, and salvage, and exasperating delays in ratification nullified many of the advantages such international sanction would have given. But one direct outcome of this awakened consciousness that shipping is essentially an international business was the creation in 1921 of the International Shipping Conference, which has played no small part in the international regulations of shipping. The majority of maritime countries have followed the dock regulations of the British Factory Acts on the subject of cargo-gear. There is need for agreement on regulations covering the carriage of petroleum-products in tank ships on the comprehensive lines laid down by the United States governing their tankers.

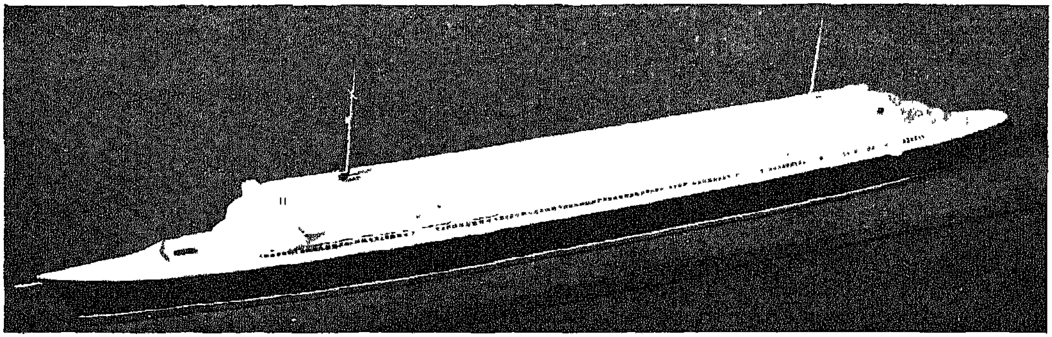
The social welfare of the seamen was the province of the International Labour Office, and it held its first Seamen's Conference at Genoa in 1920. Common agreement was reached on such questions as compensation to shipwrecked sailors, unemployment insurance, and minimum age of employment (fourteen years). The hopes of an international wages-scale for all seamen proved illusory and is not likely to be realized so long as the living-standards and wage-rates in the various countries remain so widely different. One result of this international consideration of seamen's conditions was to create a greater public interest in seamen's affairs, and it is to the credit of many leading British shipowners that they have shown a more active interest in the welfare of their men.

The wheel has come full circle. Perhaps as never before, in this Second World War we realize how much we owe to the men who go down to the sea in ships. The revelations of the conditions under which the majority of our seamen are doomed to live when afloat has come with the force of a shock. In response to this the Joint Maritime Commission of the International Labour Office met in London on January 8, 1945, where employers and seamen's representatives from Britain, the United States, the Dominions, and India, and all the great maritime Powers of the United Nations except Russia drew up an International Seamen's Charter which will mark the beginning of a new era for the seaman. Its requirements for seamen's accommodation aboard ship, with vastly improved sleeping-quarters, recreation-rooms, baths—the comforts of a home from home—will change the internal architecture of the ship. It covers every matter touching the seamen's life aboard ship, fixing universal minimum standards of wages, employment and welfare, but not precluding any seamen's organization in any country from trying to secure more for their own nationals.

A new Merchant Shipping Act, superseding the existing Act of 1894 and 1906, is now due, providing legislation to give these conclusions the force of law. Improved standards of manning, accommodation, ventilation, food, and revised methods of wage-payments on British ships must be incorporated in its reforms, and active steps taken to secure continued employment of all genuine seamen. Like Socrates, we owe a debt to Æsculapius, and the debt must be paid. The seamen do not want 'gratuities' which would compromise their civilian status. They want the nation's debt to the Merchant Service to be recognized and honoured by acceptance for all seamen, regardless of the flag under which they sail, of the conditions set forth in the International Seafarers' Charter.

The ship is a mirror of the times in which she sails. We have tried to hold up that mirror from the remote past, when it was only a raft with a pole and a skin, to the latest and greatest transatlantic liner, *Queen Elizabeth*. If too little has been said about the many inventions which have gone into the evolution of the power-driven vessel, particularly her engines—for example the possibilities of jet-propulsion, the use of colloidal fuel (powdered coal mixed with oil) still in the experimental stage—it is with no intention of minimizing their importance. Our ship is down to her marks. If we have paid regard to the lot of the seamen against a general background of callousness and indifference it is because we have been anxious to show that progress depends on the increase of the consciousness of mankind. It was Charles Kingsley in 1862 who bid "every student of history to learn what manner of men they are who become revolutionaries and what causes drive them to revolution." Our seamen are not malcontents. They are largely inarticulate and long enduring. They share a fatalism born of life on the sea. After the First World War their substantial gains were lost, and when the chorus of praise for our brave seamen had been sung they were left to face all the miseries of prolonged unemployment without even a 'dole' to help them. It will not happen again. Never again will the solution "shake the sack" be applied to win profits at the cost of men's starvation. That solution is discredited. It can be said now that there is no class of British citizens looked after with more solicitude by the Government than our seamen, and that the shipping industry has far outlived its reputation as a bad employer. The modern ships with which they are restoring their depleted fleets are a credit to their times.

Through co-operation, both national and international, is the way of salvation, and no sectional interests must be allowed to profit at the expense of the common good. The astonishing achievements of progress have not been the work of one people. In science and invention there are no frontiers except the limitations of knowledge. Let us look back on the history of man, and in spite of human perversity he has followed his Platonic vision, ever painfully climbing towards the Ideal Republic. From this we can gain both inspiration and faith to go forward. The history of ships and men is a mingled yarn of tragedy and triumph—a mirror of the larger world which it has helped to shape. Oh, for a day when ships go forth on their errands to the ports of the world as messengers of goodwill, and their happy breed of seamen shall labour not only for pay! Call it a dream, but it is a beckoning gesture, the indenture of men's hopes, which has inspired his finest achievements—the witness of precious things unspoken but dimly understood ever since man launched his raft on the waters.



A Model of the Luxury Liner of the Future

By courtesy of Bassett-Lowke, Ltd

Yet when this fiery web is spun,
  Her watchmen shall descry from far
The young Republic like a sun
  Rise from these crimson seas of war.

The last war has been fought in which there are victor and vanquished. With the explosion of the atomic bomb in Hiroshima the world moved for good or ill into another age. Now we are faced with the stark decision—peace or the final defeat of civilized man. The nations must co-operate, for this time nature offers no alternative but annihilation. Never again can there be victory as the prize of successful war. In the noble words of the *Times* leader:

> Humanity stakes its life upon its ability to prove itself worthy of its material achievement. The intellect, the skill, the organizing power have already been made visible. Nothing is lacking to a well-found craft—except the rudder. And nothing can provide it save vision, purpose, faith. . . . A huge opportunity—accompanied by the huge risk which is the condition of all opportunity—opens from this moment before the feet of man.

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